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TRANSACTIONS

OF THE

KENTUCKY STATE MEDICAL SOCIETY

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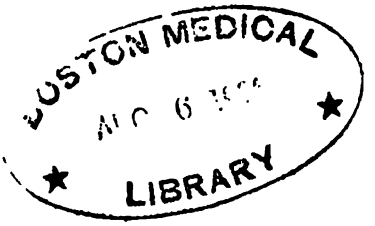
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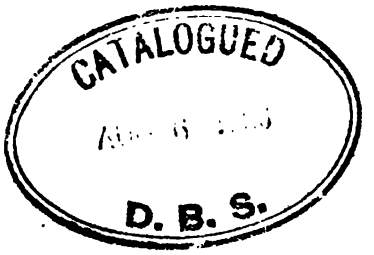
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NOTE.

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PREFACE.

The Committee has adhered to the precedent established by former committees, in publishing but one public address, namely, that of the President.

The Committee calls attention to the fact that it has been found impracticable to publish more than one paper from each author in the present volume.

M. F. COOMES, *Chairman*,
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} *Committee.*

DR. J. B. MARVIN.

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THE PRESIDENT'S ANNUAL ADDRESS.

By J. B. Marvin, B. S., M. D.
Louisville, Ky.

As the spokesman for the nonce of the medical profession of the State, my first duty is to give you all a hearty welcome, not less to you, old friends, who, mindful of the happy associations of former years, return to read, discuss or listen to papers bearing on our daily work, than to you, ladies and gentlemen, representing the beauty and chivalry of the Bluegrass, who have graced this occasion with your presence.

I would be more or less than human if I were unmindful and unappreciative of the compliment you have done me in choosing me as your presiding officer. I count it no slight honor to address such an audience, and I crave your support and indulgence, that business may be expedited and the meeting prove profitable and pleasant.

The President's address is usually a review of something. I shall not detail the history of the State Society nor call the roll of the medical giants of the past day, who have laid aside their armor and crossed over the river to rest under the shade in that garden where there is no death. My friend, the Old Man Eloquent, whose lips have been touched with a live coal from the altar, will to-morrow stir your minds and hearts by his recital of the glorious achievements of our compeers. As an old English adage has it, A man at forty is either a fool or a doctor. Our name betokens that we do not belong to the first class, and we trust we shall so comport ourselves on this our fortieth anniversary that you will not think we should be classed under the first head. But without the "adventitious trappings of an expansive fancy" I shall first make a few suggestions for the good of the Society.

First, we should have more members. Our present membership is only 367, including those who have died. The total number of doctors registered in the State is 2,275.

There should be organized in each county a county medical society, which should be in affiliation with the State Society, and thus in affiliation with the American Medical Association. This matter should be agitated, and a suitable committee should be appointed to elaborate the details. Our State motto we follow only in part, and so, divided, we fail or fall.

In union there is strength. Home mission work must be done. The voice of the State Medical Society should be the voice of the united active medical men of the State. A medical society is not only a great stimulant to better work, but also a preventive of narrowness, petty jealousies, and bickerings. This seems to me to be the most pressing duty laid upon us.

Second, dues should be reduced to the minimum, and promptly collected. One fee should admit to local and State Society. The minutes should be published promptly, and the Volume of Transactions either abolished or members reading papers should furnish advance copies to the Publication Committee so that these transactions can be brought out within a reasonable length of time.

Third, abolish the banquet as an unnecessary tax and burden on the local physicians. Follow the precedent set in Harrodsburg.

Fourth, the By-laws should be codified, and Constitution and revised By-laws should be published in the next Volume of Transactions.

Fifth, continue the present plan of selecting the Nominating Committee as the fairest way and one least open to adverse criticism. Also the present plan of selecting topics for discussion. Let us avoid ceaseless tinkering with the By-laws.

Medicine is the most sober, the most positive, and the most absolute of all the sciences, and let us not make our annual meetings mere junketing trips and the scene of medical

polemics. "If we conceive chaff, we can bring forth only stubble."

Sixth, we should be in closer touch with the State Board of Health, which has been greatly crippled for the want of funds and by lukewarmness on the part of the profession.

We should have a committee on public policy to agitate and influence legislation. The public do not appreciate the efforts of our State Board of Health for the prevention of disease. They can not understand the disinterestedness of the medical profession, and doubtless the Secretary of our Board has often felt like "a pelican in the wilderness" and "a sparrow on the house-top," and when attempting to influence a community in a sanitary direction has felt like "whistling in a graveyard." But let us persevere, our aim being "that all may have life, and may have it more abundantly;" and surely all of us have felt in some degree the happiness of the patriarch of old, "The blessings of him that was ready to perish came upon me, and I caused the widow's heart to sing for joy."

Seventh, our State and National Government spend with prodigal hand on the complex machinery of government and for military and naval purposes, but what niggardly appropriations for keeping out "the pestilence that walketh in darkness and destruction that wasteth at noon-day."

We should add our influence toward the establishment of a National Board of Health, with a Cabinet officer, which department should have entire charge of quarantine, should furnish pure virus, antitoxines, etc., and disseminate literature and knowledge concerning pure food, drinks, etc.

Take consumption, for example. It destroys two sevenths of the human race. Where two or three families are gathered together there it is in their midst to claim its victims. In a single line science gives us the means of practically stamping out the white plague: Destroy the sputum, disinfect the milk.

We may carp and cavil at sanitary preachments if we will, but we ignore them at our peril; and, while all our efforts have hitherto proved unavailing, let us not turn away and lose the name of action, but work and wait and hope.

Two subjects have towered above all others during the past year:

First, Medical Education. Greater than all other advances in medicine, "by the all hail hereafter," because having the promise and potency of results exceeding any yet achieved, is the elevation of the standard of medical education. The cry has gone forth, "This place is too strait for me, give place that I may dwell." The methods of instruction have radically changed. More practical demonstrative work in suitably equipped laboratories, with fewer lectures; practical clinical and bedside instruction to small sections. The curriculum has been increased and lengthened, first to three years of six months each, and now to four years, graded courses, of six months each. This radical advance, while diminishing the number of students, will have the effect to improve the quality. Only the honest and earnest students, who can afford time and money, will care to take up the study. From the more careful preparation in the scientific branches of medicine, chemistry, histology, pathology, etc., the student will enter his senior year ready to apply all modern scientific aids to the study of disease at the bedside. From the laboratory and hospital will come trained clinical observers, and then will develop another and much needed specialty, that of internal medicine.

It is necessary to know before instructing, and to see before leading, if the ditch is to be avoided. The wisdom of our day is proverbially the foolishness of the next, and to plant the standard of truth an inch in advance of our own generation is exceedingly difficult.

Knowledge is created by addition; the same man can not lay the foundation and perfect the superstructure. We are as

children astride the neck of a giant. Aided by the labors of our predecessors we see all that they saw and something beyond. "In wonder all knowledge begins, in wonder it ends, and imagination fills up the interspace."

May I speak to the doctors of Kentucky, that they go forward, neither burying their talents nor prostituting them.

Second, Immunity, Antitoxines, and Serum-Therapy. Protective inoculations more than any other subject has occupied the mind of the profession the past year. It is either a tremendous farce or the greatest discovery since the introduction of vaccination by Jenner.

So many methods have been introduced and carried to the topmost wave only to be dashed into spray, that we should be cautious of our conclusions until time enough has elapsed to determine whether the light in the horizon be the sign of the dawn or simply a will-o'-the-wisp to turn the traveler from the narrow path of truth into unknown depths.

The latest science only confirms the dictum of the inspired sanitarian, "The blood is the life."

The greatest advances have been made in the study of this fluid in the last few years. We know more now of its properties in health and changes in disease. We understand in a measure how bacteria and their products "touch all the life of the blood corruptibly."

In the scale of living things man stands at the head, and the unicellular organisms known as bacteria at the foot, yet the relations of the microbes to the "lord of creation" are more important and more complex than those which exist between man and any other group of living organisms.

These are little rod-shaped bodies, 1,500 of which placed end to end would scarcely reach across the head of a pin; if a man was magnified as much he would be about four times as big as Mt. Washington. Their rôle in nature, though humble and silent, is extremely important. They are absolutely indispensable to the continuance of the higher forms

of life. They are man's invisible friends and most faithful and active servitors.

A few of them are inimical and hurtful. These are the so-called pathogenic germs. They are man's secret foes.

These organisms can be cultivated, and we learn their naked-eye characteristics.

The mysterious veil which has so long hung over some of the most widespread and terrible diseases is being gradually drawn aside, and we now stand face to face with the known and understood, and no longer for the most part with the mysterious and incomprehensible forces. A few years ago it would have seemed an idle tale to say one could cultivate in the laboratory the living essence of consumption, cholera, typhoid fever, etc.

Slowly the prevention of disease is getting to be recognized as the great problem and an established fact. Already knowledge has outrun practice, for if the known truths of preventive medicine were applied the present death-rate would be diminished one half.

In the prevention and treatment of disease caused by pathogenic micro-organisms theory and practice are met together, science and art have kissed each other.

The etiological treatment of diseases caused by micro-organisms has for its foundation the fact that specific germs produce within the living organism, and also in their own culture fluids, substances which are inimical to their own life conditions, and that these infectious diseases thus become self-limited and the cultures die out before the nutrient substances are exhausted.

The products of most disease-producing bacteria when introduced in sufficient quantities into the blood of a well or sick person produce as a rule symptoms of poisoning similar to the symptoms which are observed in the onset and course of all infectious and contagious diseases, being fever and chills, general *malaise*, weakness, depression, loss of appetite,

etc. The degree of the symptoms depends upon the quantity and rapidity of such toxic absorption.

The products of one kind of germ are not necessarily destructive to others, and upon the exhausted culture soil, on which no further growth and development are possible for a particular kind, other kinds will grow and thrive luxuriantly until they too have reached their limitation.

This shows that each specific germ produces a substance or substances peculiar to its kind, which is destructive to the producer only, and each may therefore be accepted as a specific germicide. Under the formation and accumulation of this substance in the infected living organism the development and growth of the germs are first hindered and retarded, and when present in sufficient amount are destroyed, and recovery takes place with or without immunity to future attacks. It is a well-known fact that one class of animals is more susceptible to a certain disease than another, and that some are by nature protected against the disease. They are *immune*. This immunity may be natural or accidental or acquired. Natural immunity is the process by which the healthy body resists the invasion of destructive agents.

Phagocytosis, the theory advocated especially by Metschinkoff, while fascinating, has been hotly disputed, especially by Buchner, who was the main advocate of the theory that natural immunity was due to action of the blood serum. Hankin and others have shown that the germicidal power of the blood serum depends upon the presence of certain proteids, which have been called "protective proteids," or by Hankin "alexins," who arrives at the conclusion, that while these bodies are present in blood serum free from blood cells, yet they are the product of certain leucocytes. Vaughan claims that these germicidal bodies are nucleins and are furnished by the polynuclear leucocytes.

The latest teaching is that natural immunity is due to a germicidal substance present in the blood serum, which has

its origin chiefly in the leucocytes and is soluble only in an alkaline medium. A local infection is usually resisted by an afflux of leucocytes to the point of invasion. Actual phagocytosis is of secondary importance in resisting parasitic invasion. A general infection is resisted and, in non-fatal cases, overcome by an increase in the number of leucocytes and in the alkalinity of the blood serum, which favors solution of the germicidal proteids contained in the polyneuclear leucocytes. A sharp distinction must be made between natural and acquired immunity. The "protective proteids," "alexins" or "nucleins" are destroyed at comparatively low temperatures, 50° to 60° C., have germicidal and globucidal properties, and in no sense are they products of bacteria.

Acquired Immunity. I will not weary you by discussing the theories of artificial or acquired immunity, but will summarize the latest teaching on this subject, referring you to a recent work on this subject by Sternberg for a full discussion.

Toxines and toxalbumens are the poisonous products of bacterial growth and are the causes for acute disease when circulating in the blood. When thus circulating in the blood they produce an intoxication, while, after the introduction of virulent germs the cause of the disease is an infection, the germs multiply and by change of products form a poison which when absorbed has a general effect as a secondary result.

Pasteur must be credited with having placed these facts upon a scientific basis, and he gave the impulse for the development of a new and highly important science.

Immunization products not bacteria themselves.

Behring's Law. Blood and blood serum of individuals which has been rendered immune artificially against a certain infectious disease may be transferred into another individual with effect to render it immune.

"1. Infectious diseases are transferred by their specific microbes and their product.

"2. By the action of the microbes toxic substances are produced which are the essential cause for the disease.

"3. The toxic substances, called toxalbumens, are of albuminous nature and of variable degree of toxicity.

"4. The toxalbumens can be prepared from cultures of the microbes as well as from parts of the diseased organism in which they are circulating.

"5. The inoculation with either the blood serum of an infected animal or with the toxalbumen brings on similar pathological conditions as in original case.

"6. The existence of another substance antagonistic to toxalbumen in its physiological effects, antitoxin."

The blood of a person naturally immune against a certain disease does not possess any immunizing property for other individuals.

This proves that the immunizing agent is not a substance produced by nature in those animals, but is the result of an organic chemism to which the impulse must be given by introduction of the corresponding poison.

By this method we strive to prevent and to cure under favorable circumstances the infectious diseases.

The exact source and method of production of antitoxines in the animal body and their mode of action are still undetermined, and for the present we can only say that in some way the so-called antitoxines which have been proved to be present in the blood serum of immune animals protect these animals from infection by pathogenic bacteria. When transferred to susceptible animals a temporary immunity is conferred upon them, or, if injected after infection has occurred, may neutralize the toxines produced by the specific disease germs.

Acquired immunity is acquired by accidental or artificial means, the former in a case of previous sickness, the latter by a protective inoculation. Tolerance must not be confounded with immunity.

The principal factor in acquired immunity is the presence in the blood of the immune animal of some substance capable of neutralizing the toxic products of the particular pathogenic organism against which immunity exists or of destroying the organism itself. These substances are called "antitoxines." They differ from "alexins" in having no germicidal or globucidal action. They resist sunlight and require a temperature of 70° to 80° C. for their destruction.

Protective injections of antitoxines have been successfully used in tetanus, pneumonia, and especially in diphtheria. The latter subject has been ably discussed this afternoon. The diphtheria antitoxin demands our serious consideration and painstaking discrimination for a sufficient length of time. Its greatest significance is that it is a promise and hint of what is to be. Now, better than ever before, the physician's work may be summed up, "From Life, through Life, to Life," and how often and in how many places does the warning "Hitherto shalt thou come, but no further," make us to pause.

Our highest encomium should be, our work was

> " . . . accomplished in repose,
> Too great for haste, too high for rivalry."

As the century plant pours the strength of its hundred years into the unfolding of its last years, so may we not look for the outflashing glory of the nineteenth century in its ending?

> "Labor with what zeal we will,
> Something still remains undone,
> Something uncompleted still
> Waits the rising of the sun.
> * * * * * *
> And we stand from day to day,
> Like the dwarfs of times gone by,
> Who, as northern legends say,
> On their shoulders held the sky."

DIPHTHERIA: CLINICAL DIAGNOSIS AND LOCAL TREATMENT.

By W. D. McCLURE, M. D.
Lexington, Ky.

The subject of diphtheria is one fraught with so much interest to the medical profession and the laity alike, that its very name sends a chill to the heart of every mother who has seen it lay violent hands on the tender babe or hopeful youth of the family, and in a few short desperate hours consign him to a premature grave.

As your very able committee has seen fit to compliment me with a place on the programme, I shall now attempt to speak as best I can on the subject assigned, viz., Clinical Diagnosis and Local Treatment of Diphtheria.

The term diphtheria, until a few years ago, had such a vague and mysterious significance that even our best authors and most astute writers were not agreed as to what clinical and pathological conditions were embraced by the term. While some gave the name to all so-called croupous inflammations of mucous membranes, with the production of pseudo-membrane, others limited the term to an acute infectious disease of a constitutional character, with a local, generally throat, lesion, the local lesion being usually characterized by the production of a false membrane.

But thanks to the researches of Klebs, Loeffler, Prudden, Roux, and Yersin, these mysteries have largely been cleared away, and we are now enabled to view them in a more intelligent light. They have taught us that, while clinically true diphtheria resembles other similar conditions embraced under

the term pseudo-diphtheria, the two groups of affections are radically different in their etiology, viewed from a bacteriological standpoint.

As we have already intimated, the mere clinical diagnosis is extremely unreliable, and should never be relied upon where more accurate diagnostic means are at hand. In support of this statement may be cited the fact that in 1893 the New York City Board of Health instituted a series of accurate bacteriological examinations, and according to their report examined 5,611 cases that had been clinically diagnosed diphtheria. Of this number Klebs-Loeffler bacilli were found in 3,255 cases, while in the remaining 1,540 cases no Loeffler bacilli were found. It will thus be seen that the number of mistaken diagnoses amounted to thirty-two per cent. Of course in my argument I am proceeding on the assumption, which I think has been clearly proven, that there is no true case of diphtheria without the presence of the Klebs-Loeffler bacillus, which I regard as the specific infectious agent.

The modern history of diphtheria dates from June 26, 1821, when Bretonneau read his first essay on that subject before the French Academy of Medicine and gave to the disease the name it now bears. Since this time there has probably been more research and a greater number of articles, scientific and otherwise, written on this one subject than any other half dozen diseases with which mankind may be affected. Of the many authors who have written volumes on the subject, none to my mind have given a more concise and accurate definition of the disease than has our own Jacobi, who says that "diphtheria is a specific infectious and contagious disease, characterized principally by epithelial changes in and exudation of fibrin on and into the mucous membrane, the surface of wounds and rete-Malpighii, thereby constituting the so-called pseudo-membrane."

In most cases there is a prodromal stage lasting a few days and resembling catarrhal pharyngitis. There is a slight fever

together with painful deglutition, more marked when swallowing liquids than solids, headache and occasional vomiting. If the case be a very malignant one there may be convulsions with a temperature ranging from 102° to 104° F. At this particular stage the characteristic objective symptom of diphtheria is the presence of a membrane on the fauces, the arch of the palate, the tonsils, or the posterior pharyngeal wall. The membrane is usually found in small, loose patches, or it may be deeply imbedded, according to the locality. These patches in a certain length of time, ranging from twenty-four to forty-eight hours, coalesce and form a continuous membrane of greater or less size and gradually increase in thickness. If the membrane forms on the uvula, soft palate, or the pharyngeal wall, it is of less thickness and can be easily scraped off, while on the tonsils it is thicker and very difficult to remove. Then again there are cases in which no membrane can be observed, the tissues being to all appearances merely swollen and reddened, with a grayish-white discoloration, the result of an infiltration of the tissues.

Thus, according to Jacobi, we have to deal with three different manifestations of the diphtheritic process. First, with a membrane lying on the mucous membrane, and removable without causing much injury. To this is given the name croupous deposit. Second, with a membrane implicating the epithelium and upper layers of the mucous membrane. To this has been given the name of "diphtheritic membrane." Third, with a whitish or grayish infiltration of the surface and deeper tissue which, if abundant, may give rise to a necrotic destruction of the tissue. In the severer forms of diphtheria the lymphatic system is involved. The temperature runs from 105° to 107° F., and when the membrane is from any cause dislodged it immediately reforms. The membrane occasionally extends to the neighboring parts, involving the nasal cavities, the larynx, and sometimes, but very rarely, to the ear itself. The membrane has been known

to form on the cheeks, tongue, and gums. Wounds and abrasions are easily infected and are frequently the seat of diphtheritic membrane, this being especially true of the wounds made in the operation of tracheotomy.

Other diagnostic symptoms might be mentioned that would aid the physician in his effort to make a clinical diagnosis, but it seems useless to multiply them after having given the ones most usually found present. Especially does this seem useless in view of the admitted fact that, with all the pathological conditions present, it is absolutely impossible to say beyond a doubt that we have a case of diphtheria if only the clinical diagnoses be relied on.

In other words, there are no constant differences which separate the simple non-contagious forms of inflammation from the diphtheritic and communicable types, and it is only in a small per cent of cases that an early and reliable diagnosis can be had from any data obtainable.

To substantiate this apparently pessimistic argument, I again quote from a circular address issued by the New York Board of Health: "It has also been shown that a considerable number of cases which are apparently false diphtheria prove on bacterial examination to be true diphtheria. While in true diphtheria the mortality is very high and the danger of transmission to others is great, in false diphtheria the mortality is low and the danger of infection slight. The differential diagnosis between true and false diphtheria can be made by bacteriological examination within twelve hours, while without this the differentiation is difficult or impossible."

In those cases in which bacteriological examinations have shown the absence of the Klebs-Loeffler bacillus the mortality has varied from one to five per cent, and the cause of death has usually been broncho-pneumonia, and not the local disease; while in those cases in which the bacterological examinations have shown the presence of the Klebs-Loeffler

bacillus the mortality has varied from twenty to nearly fifty per cent.

Many other diagnostic symptoms might be mentioned that would aid the careful observer in deciding a differential diagnosis; but it must be admitted that, as numerous as are these symptoms, the most astute observer and careful practitioner often fails to make a correct diagnosis, and these frequently occurring blunders go to establish the truthfulness of an assertion made, I believe, by Dr. George F. Shrady, that "diphtheria diagnosis and diphtheria therapeutics have got to be started over again on a new basis, viz., that of bacteriology." However, with our present knowledge of the disease it is well to consider and locally treat all doubtful cases as true diphtheria, and take all necessary precaution till the accurate diagnosis by bacterial culture can be obtained.

In approaching the treatment of diphtheria we must frankly admit that it has been disappointing in the extreme, and that the dreaded disease is still the scourge of childhood, a horrible specter to the parent, and a sickening reproach to medical art. But in accordance with the division of this subject by your committee your essayist is to speak only of the local treatment of the disease. We must therefore forego the temptation to discuss the treatment from its more enticing phases and confine ourselves to the local or topical application of remedies to the diseased parts. Of the numerous remedies used locally in the treatment of diphtheria, the ones that are most generally resorted to and have given greatest satisfaction are chlorate of potassium, nitrate of silver, chromic acid, iodine, corrosive sublimate, methyl blue, tincture of iron, carbolic acid, and peroxide of hydrogen. Each one of these several remedies has from time to time had its advocates, and one would conclude from perusing their eulogies on each particular hobby that the question of treatment for this dreadful disease had been definitely settled, and that in each

of the above named remedies we had a specific pure and simple. But alas for human fallibility! Experience has proven, sadly proven, that in the majority of cases these remedies as curative agents utterly fail, and about the only thing that may be said in their favor is that they are helpful adjuncts to other lines of treatment.

The tincture of iron is mostly beneficial on account of the free hydrochloric acid it contains. The nitrate of silver is but a superficial caustic, while the chromic acid is too heroic in its caustic effects. Iodine and its vapors are too irritating, while solutions of carbolic acid are poisonous and not reliable as germicides. But I think I can safely say that in peroxide of hydrogen we have a remedy, or rather an adjunct, that is of no little value in the treatment of diphtheria when judiciously and skillfully used. As before stated, the hydrogen peroxide is a valuable aid in diagnosis, as by its application to the throat, if there be but a small trace of membrane, it causes it to assume a white color, and on this a fine foam to arise, caused by the liberation of oxygen gas. In this manner we are able to detect a membrane much earlier than would otherwise be possible without the use of this valuable diagnostic aid. If the stronger solutions of peroxide be used, say from twenty-five to fifty volumes, it is certainly the most active and least harmful of germicides, while at the same time these solutions are not poisonous or harmful to the mucous membrane. In addition it cleanses a foul throat and breaks up and disintegrates certain portions of the diphtheritic membrane, thus rendering the bacilli more accessible. In the use of the peroxide we would insist that the solutions should be in the greater strengths, and in proportion as this rule is observed benefits are derived. As a general rule the throat should be sprayed with the peroxide every three or four hours during the night and much more frequently during the day. This should be persisted in during the first forty-eight hours of the disease, and if the membrane be resistant even

a stronger solution than fifty volumes should be applied, provided the parts are first sprayed with a solution of cocaine.

There are certain objections urged against the use of peroxide of hydrogen, but these are very much outweighed by the great benefits derived from its use, and we are firmly of the opinion that if the peroxide be applied early, continuously, and judiciously, the mortality rate of true diphtheria may be very much reduced.

SANITATION IN DIPHTHERIA.

By Wm. Bailey, M. D.
Louisville, Ky.

An intelligent discussion of the sanitation of diphtheria must first take into consideration its causation.

Sanitarians are greatly indebted to those eminent men who, in these last years, have added so much to our knowledge of etiology. We acknowledge with gratitude the work of the bacteriologist. Our work in the prevention of disease can not in the nature of things go before, but will follow in the wake of a more accurate and intimate knowledge of the influences that produce it. This is especially true in regard to those diseases that we usually style specific.

We have no new theory to advance as to the cause of diphtheria. We do not believe that it is a filth disease in the sense that it may be developed *de novo* from filth. We are committed to the proposition that it is a specific disease due to a specific cause, which is always present when the disease exists. We believe that to-day there is a consensus of opinion among those who are best prepared to judge that the Klebs-Loeffler bacillus is the specific germ that is responsible for the production of the disease.

Hence our work in the prevention of diphtheria is largely limited to the destruction of this germ or the restriction of its activity. We owe a debt of gratitude to the eminent men working in this field who have already made us acquainted with the history and life-work of this deadly germ.

Much more no doubt will soon be furnished us in this line, so that there is reason for the hope that ere long this

dreadful scourge, diphtheria, will be shorn of its terrors. Environment may have much to do with individual resistance to this disease. Health makes the best fight possible against disease, so that it is always best that the sanitary surroundings of all people should be of the best in order that the system may not be handicapped and compelled to enter upon an unequal contest. It is an established fact that children are more susceptible to diphtheria than are adults.

As a general rule the attack is made by the implantation of the germ upon the mucous membrane of the throat, and as no doubt all disease germs find easier work when the surface is abraded or diseased, I would advise the prompt correction of any departure from health in or about the throat when diphtheria prevails.

Given a case of diphtheria, what shall we do in the way of prevention?

First, I would insist upon the complete isolation. No one of susceptible age should be allowed to come near the sick child or in contact with any of its belongings that may have by any possibility been contaminated or infected. Isolation should be as complete as it should be for smallpox. No one in contact with the sick or with any thing the sick may have infected should be allowed to have intercourse with members of the family who are of susceptible age. The apartment selected for the sick should by preference be at the top of the house, and as completely cut off from other parts of the house as possible. The room should be denuded of all hangings and belongings that might retain the infection in order to facilitate the very necessary disinfection afterward. After the child is well enough not to further infect his surroundings, then efficient disinfection should be practiced. Let no guilty germ escape or even any that may possibly become so.

Heat, bichloride of mercury and sulphur are the most readily available disinfectants for this disease. I will not tax you with specific instructions for disinfection, but will refer

you to an incomparable report upon this subject made to the American Health Association.

In cities houses should be placarded, and if necessary quarantine should be established, as for smallpox or yellow fever. Children that have been sick with diphtheria should not be allowed to associate with other children in the family, school or elsewhere as long as they have the germ of the disease about them. Only after repeated observations have demonstrated the entire absence of the germs should the convalescents be returned to the family and school. I will state that domestic animals, cats, dogs, etc., the pets of the children, may be the carriers of the contagion of the disease. All discharges from the throat and nose should be at once destroyed by fire, and every thing used by or in contact with the sick should be disinfected before it is permitted to leave the apartment. I beg leave to close this very imperfect paper by directing your attention for a little while to a subject in this connection of paramount importance: The subject of immunity. It is the subject of the age.

I shall only refer to that immunity that may be acquired. In some of the specific diseases it is the rule that one attack renders the subject of it forever exempt. Such is the rule in smallpox, scarlet fever, measles, and typhoid fever. However, exceptions oftentimes exist, for instance persons have been the subjects of smallpox many times repeated. Diphtheria unfortunately does not by one attack give immunity for any great length of time. Probably for not more than six or eight weeks. This exemption for this short time exists, however, as we will endeavor to show later.

It is now believed that most of the disease-producing germs have as their product ptomaines, toxalbumins, etc., known as *toxines*, and that it is to these poisons and not to the germs themselves that many of the disease phenomena are due. Prof. Victor C. Vaughan has done some excellent work going to show that when nature is stimulated to resist-

ance by these enemies the cells of the body develop neucleins and by these antagonize the action of the toxines.

No doubt exists in my mind but that when the body is attacked by a disease-producing germ the first effort is made for its destruction, but, failing in this, then by cell action there will if possible be developed an antidote for its poison. I think it in proof that nature cures many diseases by the development of special antitoxines antidotal to the poison of the specific germ. This is the basis of serum therapy; but, inasmuch as I am barred by the limitations of my subject from that consideration, I will say of serum immunity or prevention a specific germ produces its own specific toxin and under its influence the system produces the antitoxines for that specfic poison.

For instance, under the influence of the pneumococcus we have produced pneumotoxines, but under the stimulation of this poison the cells produced anti-pneumotoxines. We can thus understand why the antitoxin of Behring does not cure cases of mixed infection.

The antitoxin is developed in the horse under the influence of the toxin of the Klebs-Loeffler bacillus, and hence is antidotal to it and may not be to other toxines.

The antitoxin is standardized by finding the amount of it necessary to prevent fatal effects from following certain doses of the toxin. It is in this way certainly proved to be preventive.

Unfortunately an attack of diphtheria does not afford the indefinite exemption that is afforded by smallpox from further attacks of that disease, yet I am constrained to think that exemption exists from diphtheria after an attack, else why is there not at once a reinfection from the surroundings, which are certainly capable of infecting another child who has not had the disease? Why should convalescence ever be established unless some protection or immunity is afforded by the attack? I am convinced that by the antitoxin we can

exempt perhaps for as long a time as an attack will exempt. By vaccination we can exempt for as long a time as an attack of smallpox will exempt, and so I believe the prophylactic dose of antitoxin will exempt for as long a time as the attack of diphtheria will exempt.

Hence I believe that it will be proper to give all children who have been exposed to diphtheria the benefit of the antitoxin as a prophylactic, just as we vaccinate all persons who have been exposed to smallpox. This should certainly be done in those cases where we are not able to secure isolation. Keep the child that has been exposed under the prophylactic influence of the antitoxin until the child that is sick has convalesced so that he can no longer affect or, more properly, infect others, and then practice efficient disinfection.

This is what we do in smallpox, isolate, vaccinate, and disinfect. You will all willingly and readily bear witness to the prophylactic power of the salts of quiniæ as against malarial fever, and yet you will not fail to give your patients the benefits of it because you can not by the administration of these salts for one season give or afford exemption for all time.

I am exceedingly optimistic as to medicine all along the line, and especially so in regard to preventive medicine.

DIPHTHERIA: BACTERIOLOGY, PATHOLOGY, AND DIAGNOSIS.

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The disease corresponding to the clinical picture of diphtheria of to-day seems to have existed and been known as far back as we can trace medical history. We have but very little assurance, however, that any thing of the etiology or pathology has been known up to the present century. Asclepiades is said to have performed laryngotomy. Aretacus, of Cappadocia, has given the first good description under the name of Ulcus Syriacus. Galen and Caelius Aurelianus recognized diphtheria of the pharynx and larynx, as well as the diphtheritic paralysis of the soft palate. In the fifth century Aetius distinguished white and grayish patches and gangrenous degeneration, observed paralysis of the soft palate, and advised against energetic local treatment and the forcible removal of the deposits before they were in a condition to fall off spontaneously.

Epidemics seem to have occurred in the Old World in every century, and clinical observations gradually increased in accuracy. The disease appeared in the New England States in the seventeenth century. Samuel Danforth lost the four youngest of his twelve children by the "malady of bladders in the windpipe," within a fortnight in December, 1659, at Roxbury, Mass. Various epidemics occurred in New England after that. During the second half of the eighteenth century two writers deserve special notice, Home, a Scotchman, 1765, and Samuel Bard, an American, 1771. Bard

described most accurately diphtheria of the different mucous membranes and the cutaneous surface, speaks of its infectious character, and recommends separation of the sick from the well. His book was translated into the French in 1810 (by Ruette). The modern history of diphtheria begins with the reading of Bretonneau's first paper on Diphthérite, a name given by him, before the French Academy of Medicine, June 26, 1821. He asserted the identity of angina maligna, or by whatever title it may be known, with membranous laryngitis. First and foremost he called attention to the continuity of the membrane (according to him composed of coagulated mucus and fibrin) of the nose, pharynx, and respiratory tract, its identity with certain morbid processes of the skin, and advanced the theory that diphtheria is a specific disease, an affection *sui generis*, and differs both from a catarrhal and a scarlatinal inflammation.

Bretonneau's first paper was followed by several others in successive years, all summed up in his celebrated monograph: "Des Inflammations Spéciales du Tissu Muqueux, et en particulier de la Diphthérite, etc. Paris, 1826."

From this time on the literature on this subject has become more voluminous from year to year. New clinical as well as pathologico-anatomical observations and investigations followed rapidly. The greatest points in dispute have ever since been the identity of the two processes, croup and diphtheria, from an anatomical not so much as an etiological standpoint; then above all, since the school of Henle in 1840, Buhl, Pollender, Brauell, Davaine, and Pasteur, the question as to, first, the existence, and, second, the relationship of micro-organisms to this disease have kept things moving at a lively pace. Some of the principal contributions to the history of the disease have been given by Trousseau, Bourgeoise, Rilliet and Barthez, Bamberger, Buhl, Virchow. In 1847 the latter first made the anatomical distinction between catarrhal, croupous, and necrobiotic varieties of laryngeal affection.

Among the following workers may be mentioned West, Sanderson, Billroth, Oertel, Eberth, H. C. Wood and Formad, and many others. Here begins a period to which well fits the quotation of von Ziemssen at the opening of the late congress at Munich: "*Rerum cognoscere causas*," or, to go a step further, one quoted by the late Dr. J. A. Broadus, of Louisville, in his last address to the graduating class of the Kentucky School of Medicine: "*Prius cognoscere, deinde sanare.*" Most all investigators recognized the presence of micro-organisms in the pseudo-membrane, and sometimes in the tissues and organs; all of them, however, speak only of micrococci, and while some have thought these to be in etiological relation to the disease, others have looked upon them as simply accidental in development, an effect rather than a cause. Thus Wood and Formad (in 1880) declare it altogether improbable that bacteria have any direct function in diphtheria, that is, that they enter the system as bacteria and develop in the system and cause the symptoms. In a later publication of a number of other experiments and conclusions, as late as 1882, the same authors say: "There is no proof as yet that the micrococci are the cause of the disease. Their presence in the exposed dead tissue is no evidence, for the membrane represents but the necrotic mucous lining, etc."

Up to this time the only organisms attracting attention are the different micrococci. In 1883 Klebs found constantly present, in the pseudo-membranes of patients dying with true diphtheria, bacilli of a peculiar and striking appearance. In 1884 Loeffler published the results of a very thorough and extensive series of investigations on this subject, having made use of the modern methods of bacteriological examination, as initiated by the greatest of all living bacteriologists, Robert Koch. His examinations really mark the beginning of the new era in the study of diphtheria. He found the bacillus described by Klebs in most, but not in all, cases of

throat inflammations which had been diagnosticated as diphtheria. He separated these bacilli from other bacteria present and obtained them in "*pure culture.*" Inoculation of these bacilli into an abraded mucous membrane of susceptible animals produced pseudo-membranes, and frequently death followed. Subcutaneous injection of a bouillon culture caused death with characteristic diphtheritic lesions. Loeffler did not find these bacilli in every case examined, and also found them in one instance in the throat of an apparently healthy child. This failure to find them in all cases seems to be now explained by the fact that certain varieties of pseudo-membranous inflammations are not due to the Loeffler bacillus, but to other organisms. In several later communications, in 1887 and 1890, Loeffler has come to the positive conclusion that the bacillus is the true and only primary cause of diphtheria. Many investigators have since proven the presence of, in the majority of cases of suspected diphtheria, a bacillus corresponding in every way to that described by Loeffler. In 1888 Roux and Yersin published experiments, which not only fully corroborated Loeffler's views, but which furnished most important additional proof. They caused the characteristic lesions and symptoms of diphtheria, not only by the inoculation of the bacilli themselves upon an abraded surface, but also by filtered cultures, showing that the bacilli during their growth produced poisonous products, which were capable of causing the general lesions, except possibly the pseudo-membrane. Furthermore, they were able to produce in animals the characteristic post-diphtheritic paralysis. Roux and Yersin thus conclude from their observations: "The occurrence of these paralyses, following the introduction of the bacilli of Klebs-Loeffler, completes the resemblance of the experimental disease to the natural malady and establishes with certainty the specific rôle of this bacillus."

Finally, the macroscopical and microscopical changes in the tissues of animals dying of experimental diphtheria have

been shown by Welch and Flexner, by Babes, Benda, and others to be essentially the same as those produced in man, thus giving further proof of the *specific* rôle of this bacillus. Thus the three strictest requirements of proof that a certain bacterium is the specific cause of a specific bacterial disease seem to have been fulfilled, that is, (1) The constant presence of the organism in the diseased animal; (2) the isolation of the organism in pure culture, and (3) the reproduction of the disease by inoculations of these pure cultures and a similar distribution of the bacteria in the experimental and in the natural disease. If that be the case, we are now justified in saying (Prudden) "that the name diphtheria, or at least primary diphtheria, should be applied and exclusively applied to that acute infectious disease usually associated with a pseudo-membranous affection of the mucous membranes, which is *primarily caused by the bacillus, called the bacillus of Loeffler.*" All other cases of pseudo-membranous or exudative inflammations of the mucous membranes, in which the Loeffler bacilli are positively absent, are classed to-day as "pseudo or false diphtherias," or, as Heubner proposes, as "diphtheroids." Not including here those cases caused by different chemical agents, these pseudo-diphtherias are supposed to be caused by a bacillus resembling in some respects the true diphtheria bacillus of Loeffler, but which can be positively distinguished by careful methods, called the *pseudo-diphtheria bacillus*, and in addition to these the different pyogenic cocci, pre-eminently the streptococcus pyogenes.

If we consider the definition above given, and knowing the close clinical and pathological resemblance of the different exudative inflammations of the mucous membranes, we can see the importance of becoming perfectly familiar with the characteristics of the different organisms; for it is of the greatest importance, from a prognostic standpoint, to make the distinction between true diphtheria, a most malignant disease, and its comparatively harmless neighbors. Another

important point is to be able to make the diagnosis early, because of the extreme contagiousness of diphtheria, so that we may use preventive measures as well as curative. We will therefore study for a few moments the principal morphological, biological, and cultural characteristics of the bacilli, as well as their pathogenetic qualities.

The Loeffler organism is a bacillus about as long as a tubercle bacillus and twice as wide as this. Its morphological behavior, however, is very varying as found in the exudation or artificial culture media. This depends very likely upon their age and the character of the soil. Some are seen to be spindle-shaped, others like little dumb-bells, others lancet-shaped, and again short rods, appearing to be made up of segments, will be seen, while, in addition, a number of irregular, clubbed, flask-shaped, bizarre varieties may be detected in the field of the microscope (involution forms?). The bacillus is *non*-motile. It is aerobic, and grows at temperatures between 20° and 42° C., the most favorable temperature being 37° to 38° Celsius. The culture media ought always to be slightly alkaline in reaction. Growth takes place on different culture media, such as agar-agar, with or without glycerine, nutritive bouillon, milk, alkalinized potato, gelatine, but best suited for a rapid and luxuriant growth is the coagulated blood-serum mixture of Loeffler, made up of blood serum (best of beef or mutton), three parts, nutritive beef bouillon, one part, with addition of 1 per cent pepton, 0.5 per cent NaCl, and 1 per cent grape sugar. This is poured into sterilized culture tubes, and, after plugging these with sterilized cotton, is coagulated and sterilized in a slanting position, either by the original method of Koch, or by the rapid (American) method of Councilman, viz., rapid coagulation by heat with subsequent sterilization by steam. For the purpose of isolation of the bacillus out of the diseased body we inoculate several tubes with a particle of exudate from the mucous membrane, either by means of a platinum

noose, or by means of a cotton swab fixed to a stiff steel wire, as devised by Prudden, and followed systematically in the examinations by the New York Board of Health, by Park and Beebe, under the direction of Biggs. This swab is rubbed well against the throat of the patient and then gently over the inclined surface of the culture medium. This latter method has also been followed in the large number of examinations made in Louisville during the epidemic of diphtheria, in the fall of 1894 and the spring of 1895, by Drs. Louis Frank and H. H. Koehler at the laboratory of the Kentucky School of Medicine, and in isolated cases by myself and others.

These inoculated tubes, put in the brood-oven at a temperature of 37° to 38° C., will develop on the surface of the serum, in from twelve to eighteen hours, a number of dull, dense, whitish or yellowish-white, slightly elevated points of from one half to one millimeter in diameter. These as a rule represent diphtheria bacilli, from which now it is easy, by the well-known methods, to obtain the organisms in pure culture, either for more accurate study or for the purpose of testing their virulence by inoculation into proper animals, especially guinea-pigs. There may be seen, even at this time, other bacterial colonies with which the bacillus diphtheria was associated, but they are rarely so far advanced or so conspicuous as the Loeffler bacilli, and that is in fact one great advantage of the blood serum as a culture medium for the diphtheria bacillus. It grows much more rapidly as a rule on blood serum than do the other bacteria with which it is commonly associated. On account of the great importance of making a *certain* and *early* bacteriological diagnosis, I will mention that Ohlmacher, in a recent article (Med. News, May 4, 1895), states that four hours' growth on blood serum in the incubator has been found to develop sufficient growth of bacilli to enable him, without waiting for visible colonies, to make the diagnosis by a microscopic examination of a stained

specimen. Baginsky (*B. Klin. Woch.*, *P.* 1174–94) recommends very warmly the method of D' Espine and de Marignac, that is, removal of a piece of the membranous exudation by a forceps, and washing it in two-per-cent boracic acid solution before inoculating the culture tube. Pure cultures on blood serum, kept at a temperature of 37.5° C. for three or four days, present individual, round, elevated, grayish-white or yellowish-white colonies, about one to three millimeters in diameter. They are usually slightly elevated in the center, where they are denser than at the periphery. The surface is at first slightly moist, but gradually becomes dull and dry in appearance.

Upon glycerin-agar their growth is quite characteristic, but slower and more uncertain. They appear at first, when on the surface, as very flat, almost transparent, glistening, round points, not elevated above the surface; they have a darker, granular central portion and a lighter peripheral one. The latter becomes broader as the colony grows in size, is usually marked with ridges or cracks, and notched at the periphery; when growing deep down in the agar-agar the colonies are coarsely granular and rarely more than three millimeters in diameter. (Demonstration of culture tubes.)

On gelatine plates they form, at a temperature of 22° to 24° Celsius, small round colonies which do not liquefy the gelatine.

On bouillon they grow well, cause a slight cloudy deposit, change its reaction to an acid one within twenty-four hours, which, after a week or ten days, gives way to permanent alkalinity. Milk offers a favorable soil.

The bacilli seem not to develop spores, but they may remain living for a considerable time even outside of the body. Thus they were found to live on different culture media, by Hoffmann one hundred and fifty-five days, by Loeffler and by Park seven months, by Klein (on gelatine) eighteen months. On bits of dried membrane, by Loeffler

fourteen weeks, by Park seventeen weeks, by Roux and Yersin twenty weeks, by Abel, on a toy building-block, for six months.

The D. B. stains readily with all the basic aniline dyes; the one most used is Loeffler's alkaline methylene-blue. Strange to say, I find, in looking over the subject, a difference of statement as to the staining faculty by Gram's method. Thus, Sternberg, Welch and Abbott, Roux and Yersin, Weichselbaum state that it stains by Gram, while C. Guenther, in his excellent book, and Lenhartz are of opposing views. Time has prevented me from making personal inquiry as to the explanation for this difference of statement.

Exposure to a temperature of 58° C. for ten minutes kills the bacillus.

Its virulence to animals is naturally variable, and can be increased and lowered artificially. This variance in virulence may possibly be one reason for the varying severity of different epidemics, or of one epidemic at different periods. Of course, a very important question from a clinical point of view is for how long a time are the bacilli found and found virulent in the throat after the membrane has been thrown off, and it has been found that they may be present up to as many as nine weeks, while the average is eight to ten days.

As to the pathogenic properties of the Loeffler bacillus, it has already been stated that it will kill susceptible animals, such as guinea-pigs, cats, rabbits. A one-half to one-per-cent bouillon culture of forty-eight hours injected into them will cause death mostly in seventy-two hours, with symptoms and lesions like those in human diphtheria. Careful examination of such an experimental animal shows that the bacilli have remained principally localized and developed at and near the point of inoculation. They must therefore undoubtedly form, during their development in the tissues, poisonous substances which act detrimentally upon the tissues as well as the entire system. Just so we find them almost exclusively localized in

human diphtheria in the pseudo-membrane, and in some cases penetrating more or less deeply into the subjacent tissues. In a few cases, however, they have been found also in distant organs and in the blood. Loeffler, Kolisko, Paltauf, and Babes isolated them from internal organs, so also Frosch and others, who state, however, that they are small in number and irregular in distribution, so that it is necessary to transplant considerable quantities of material. Frosch cultivated the bacillus from the blood of the heart, the brain, pleuritic and pericardial exudates, pneumonic areas in the lung, the spleen, kidneys, bronchial and cervical lymph glands, and liver. Simon Flexner, in the case of child dead of pharyngeal and laryngeal diphtheria, obtained them in pure culture from the heart's blood, cervical lymph glands, spleen, liver, kidney, lungs, and, contrary to others, found them in large numbers in the blood, glands, and spleen. He also was able to demonstrate them in sections from the bronchi and lung tissue. Abbott tells us that after injection of a culture of the bacilli into the testicle of guinea-pigs, he sometimes found small nodules containing the bacilli in the omentum, and they have also been isolated from ecchymotic patches in the stomach and the membrane in croupous gastritis. W. T. Howard lately reports a very interesting case of acute ulcerative endocarditis, in which he cultivated from the vegetations upon the valves and from infarctions in the spleen and kidneys a bacillus possessing all the characteristics of the bacillus diphtheriæ, except that it was non-virulent to rabbits and guinea-pigs. However, at the present time we must yet regard the local process as the chief seat of the bacilli, and that here a soluble poison is formed, which, when absorbed into the circulation, causes the phenomena and changes observed clinically and pathologically in diphtheria. This poison or toxin is supposed to be a soluble albumin, a toxalbumin, and has been separated by Brieger and C. Fraenkel from pure cultures of the bacillus, and injections of the same, as well as of filtered cultures

(first by Roux and Yersin in 1888) have caused the same pathological changes as those following an injection of a culture of the bacilli themselves, including paralysis, and except perhaps the formation of the pseudo-membrane.

These pathological changes very briefly considered consist, just as in human diphtheria, of changes in every organ of the body. Oertel has described those occurring in human beings dead of diphtheria. They are characterized by multiple foci of cell-death and extensive destruction and peculiar fragmentation of the nuclei. Welch and Flexner, in this country, have corroborated and extended the results of Oertel by experiments upon guinea-pigs, kittens, and rabbits. The lymph-nodes, spleen, liver, kidneys, lungs, heart, muscles, and intestinal tract are all seats of the localized necrosis mentioned. The lymph-nodes are swollen and inflamed and in some cases become the seat of abscesses, although these are more common in the periglandular tissue. The spleen is mostly enlarged, congested, friable, and studded with infarctions. The liver is frequently hyperemic and the seat of emboli. The kidneys are diseased in most all cases of diphtheria to a varying degree, from simple congestion to parenchymatous or diffuse nephritis. Albuminuria occurs in the majority of cases, if not in all, and renal tube-casts appear in the urine, either hyaline, epithelial, fatty, or granular, depending upon the character of the kidney lesion. Uremia and marked dropsy are less common. The lungs may be congested simply, or the seat of various conditions, such as edema, bronchitis, atelectasis, emphysema, ecchymoses, or large infarctions. One of the most common complications, however, is broncho-pneumonia, or in some cases an aspiration-pneumonia ("*Schluck pneumonie*" of the Germans), caused by aspiring septic particles, food, etc., into the bronchi. The heart is the seat of parenchymatous as well as interstitial myocarditis; in some cases we find pericarditis and endocarditis, which latter may become the source of

emboli in the various organs. Most probably the nervous mechanism suffers as well. Hesse believes the sudden arrest of the heart's action in some cases is due to a real toxic effect (*Herzvergiftung*). The blood shows in most cases a marked hyper-leucocytosis.

Changes in the nerves have been described by S. Martin, Benda, Leyden, Unruh, and others. The two first named noticed that in some cases there was a defect or a total absence of myelin, shown by the inability to stain with osmic acid; the axis cylinders are intact or slightly granular, and the continuity of some fibers had been broken. In the latter case the muscles supplied by those nerves undergo a fatty degeneration. Post-diphtheritic paralysis occurs in mild as well as severe cases, but seems to be more frequent in severe epidemics, varying from four to twenty-seven per cent in cases reported by Unterholzner and G. Hoppe-Seyler. (Flexner, American Journal of Medical Sciences, March, 1895.) The serous membranes are often found ecchymotic and to contain an increased quantity of bloody fluid.

Above I have dwelt at some length upon the bacteriological methods, etc., of examining the exudation for the presence of the Loeffler bacillus and other organisms in suspected cases. These examinations have been nowhere followed more systematically than in the city of New York, under the direction of H. Biggs, and one of the most interesting reports treating the living questions of this subject most thoroughly, is the report by Park and Beebe, comprising 5,611 examinations made during the year beginning May 4, 1893. This also forms a principal part of the report by William H. Welch to the Eighth International Congress of Hygiene and Demography, held at Buda-Pesth, September, 1894, entitled "Bacteriological Investigations of Diphtheria in the United States," the last named paper also embracing the experiments and examinations by many other American workers. Such regular bacteriological examinations, especially if accompanied

by the clinical history, are bound to shed much light upon this important disease. They will enable us possibly, first, to get better therapeutical results on account of an *early positive* diagnosis, particularly so if the future shall confirm the probability that Behring's remedial serum is a specific remedy for the disease caused by the Loeffler bacillus; second, to aid us markedly in forming a prognosis, it having been found that the pseudo-diphtherias were a comparatively harmless disease; and, third, to prevent spreading of this very infectious disease by scientifically justified isolation.

In Park's series of 5,611 cases examined, true diphtheria bacilli were found 3,255 times, no bacilli in 1,540 cases, and in 816 cases the examination was regarded doubtful, because for some reason or another satisfactory cultures could not be supplied. This would make, according to Park's own method of calculating, 60 per cent true and 40 per cent false diphtheria, or if, as Flexner suggests, we leave out the 816 cases altogether, it would be 68 per cent true diphtheria. Other observers have found a much larger percentage constantly in cases clinically supposed to be diphtheria, for instance, Morse in 72 per cent, Escherich in 62 per cent, Wenderhofer in 96 per cent in a series of 100 cases. Ritter, in a series of 225 cases in children, which presented the clinical picture of genuine diphtheria, found them in every case, and he states in connection that in every doubtful case where the bacilli were not found the clinical course of the disease was most favorable.

In the 50 cases examined by Frank and Koehler, of this city, bacilli were found in only 16 cases; of these sixteen five died, while the 34 with negative result ran a mild and favorable course. Altogether the bacilli have been found in about 75 per cent of all the cases of *suspected diphtheria.* I would like to offer the following suggestions as an explanation for for this numerical difference: On the one hand there is the possibility of some technical defect in the method of inoculation and examination; on the other there is of course a wide

range for so-called *suspected* cases, depending entirely upon the clinical diagnostic experience of the physician. There are undoubtedly other exudative or pseudo-membranous inflammatory affections of the nose, pharynx, and larynx, and other mucous membranes, either caused by micro-organisms such as cocci, or by mechanical or chemical agents; some of these will be readily differentiable from the disease, diphtheria, while in others the diagnosis may be settled by bacteriological examination only.

One of the oldest discussions has been the question of unity or duality of *membranous croup* and *diphtheria* of the *larynx*, principally because some of the usual constitutional symptoms of diphtheria, including the consecutive paralyses, were absent in so-called membranous croup. Whatever may be the correct explanation for these clinical differences, bacteriological investigations speak eloquently in favor of their pathological identity. In Park's 286 cases (283 being children, 3 adults) Loeffler's bacilli were found in 229, 80 per cent. Not only that, but many of these were found to *infect others with diphtheria of the pharynx*. Such weighty evidence leaves very little room for doubt, and the New York Board of Health, in my opinion, is to be lauded for adopting the following amendment to the Sanitary Code on June 6, 1894: "That membranous croup be regarded as laryngeal diphtheria, and that hereafter physicians will be required to report such cases to the Health Department."

Ritter's numerous cases also bring him to the view that the bacillus diphtheriæ is the etiological factor in diphtheria and so-called croup. This author also offers some very earnest suggestions to the medical thinker about the possible co-effect of the streptococcus pyogenes and the diphtheria bacillus. In his opinion the constant effect of the diphtheria bacillus is to cause a very violent inflammatory reaction to which the laryngeal and tracheal mucous membrane responds by throwing out fibrinous exudation, while the pharyngeal

mucous membrane, covered with stratified squamous epithelium, shows in most cases a marked cellular infiltration, but that only with the secondary development of streptococci in the tissues, made susceptible by the bacillus diphtheriæ, the inflamed tissue becomes necrotic. The fact that the streptococci penetrate easier into the mucous membrane of the pharynx than that of the larynx, Ritter thus also explains by the more favorable nidus in the diseased pharyngeal tissue, while the rapidly formed fibrinous exudate in the larynx and trachea (the direct effect of the diphtheria bacillus) has a tendency to keep back the streptococci from the living tissue of the two last named localities. He is backed in his view by the results of experimental inoculation (into rabbits and guinea-pigs) of diphtheria bacilli into the healthy and into the previously wounded mucous membrane. The first will cause simply a fibrinous exudation, while inoculation into the previously wounded tissue causes true diphtheritic necrosis. Here, as in clinical diphtheria of the pharynx, the lesion caused by the diphtheria bacillus favors the secondary invasion by streptococci. On another occasion, at a meeting of the Berlin Medical Society, the same author believing that many or most cases of pharyngeal diphtheria are cases of double infection, that is, by the bacillus diphtheriæ of Loeffler, plus the streptococcus pyogenes, not only explains the increased danger of these cases, but hereby also explains the failure of Behring's serum as a specific remedy in such cases, and suggests the use of a double antitoxin, both from the diphtheria bacillus and the streptococcus.

Outside of this plausible theory permit me here to draw attention again to another reason for the clinical differences in some cases of pharyngeal and laryngeal or tracheal diphtheria, as suggested to us by A. Jacobi in his most classical Treatise on Diphtheria. Jacobi states, first, that the columnar ciliated epithelium of the larynx and trachea with the dense elastic structure underneath offers a greater resistive barrier

to the enemy than the stratified squamous epithelium of the pharynx and tonsils; and, second, that the large number of mucous glands in the first named localities cause, if irritated, a large quantity of mucus which favors the more ready, earlier loosening of the formed membrane, and thus lessens the quantity of poisonous products produced by the bacilli, as well as their ready absorption into the system; and, third, that the anatomical condition of the lymphatics favors the absorption of poisonous products and the invasion of bacteria much more in the pharynx than in the larynx and trachea, and explains hereby the frequent absence of lymphatic swellings in purely laryngeal diphtheria and their invariable presence in pharyngeal cases.

The whole subject, that is, the probability of *poly-infection* being a most important factor in some cases of diphtheria, as well as the diagnostic value of bacteriological examination, reminds me very strongly of the same questions confronting us in tuberculosis. Possibly nobody to-day denies the specific etiological relation of Koch's tubercle bacillus to that disease. Its *detection* by the microscope in purulent sputum is the *most positive diagnostic proof of tuberculosis*, more positive than any clinical diagnosis can ever be, and the *only positive* one in *some cases*. Still a negative microscopical examination does not necessarily imply that there is no tuberculosis, either because an error in technique may have been made, or because on account of the locality of the disease no bacilli could reach the sputum. Of course there are typical cases where the experienced clinician may be sure of his diagnosis without proof of the bacilli, just on account of his experience, so also in diphtheria. As to the second point of analogy, I will simply recall you to our experience with, and the partial failure of, tuberculin (realizing of course the total difference between it and Behring's serum). We hardly ever see a case of tuberculosis pulmonum where the sputum does not show in addition to the tubercle bacilli various other organisms,

prominent among which are strepto- and staphylo-cocci, micrococcus tetragenus, etc. And here also, just as Ritter and others suggest, in some cases of diphtheria we have really a *poly-infection*, and many clinical features, such as chilly sensations, fever, and sweating, character and quantity of the expectoration and cough, etc., are partly due to this secondary invasion of the tissues by the above named pyogenic organisms, and could therefore not be reached by tuberculin. So also in diphtheria, if Behring's serum will be found to be really an antitoxin, it can only counteract the toxin of the diphtheria bacillus and nothing else. It has no influence upon the streptococci and their effects.

For the reasons given, Behring's serum alone ought not only to be used at the *earliest possible time*, but in addition an early and effective antiseptic local treatment ought to be employed with the view to prevent the secondary invasion by streptococci, or to destroy them.

Great interest has been caused by the detection of virulent diphtheria bacilli in some chronic pseudo-membranous affections, such as membranous rhinitis or rhinitis fibrinosa. Ravenel, Abbott, Park, and many German writers have found them in such cases, and inoculation of pure cultures from them caused diphtheria in other localities. These cases were formerly little considered, but if we know that they are a source of danger to others we ought in every case to make the bacteriological diagnosis and treat it as diphtheria. Baginsky has called these cases chronic diphtheria; others speak of them as latent diphtheria. How do we explain the relative harmlessness of these latent cases to the affected individual? I would suggest that it may be due to (1) a lessened virulence; (2) a lessened disposition of the individual, or possibly (3) a developed immunity by that individual by gradual immunization, similar to that in experimental immunization.

As to the isolated occurrence of living diphtheritic bacilli in the throats of apparently healthy individuals, which possi-

bly in most instances have been in one way or another exposed to the infection of diphtheria, we may give similar explanations as given in membranous rhinitis. Still the occasional existence of pathogenic bacteria upon the mucous membranes of healthy individuals as harmless parasites is a question of most vital scientific interest, and is far from being clearly settled in my mind.

Whatever may be the true explanation of immunity or its *modus operandi*, one thing seems certain, that is, that the body or the cell in health possesses undoubted protective barriers which must be broken down to a greater or lesser degree before bacteria can develop in the tissues and absorption of their poisonous products can occur. While some extremists see in the pathogenic bacterium the only direct cause of an infectious disease, I agree with Hüppe and others that *only the combined factors, that is, the bacterium and the diseased, the less vitalized cell, will result in disease. The higher the vitality of the cell in the individual the more marked will be the resistance to the disease-producing agent.*

In conclusion I beg to draw attention:

1. To the fact, that modern methods of bacteriological investigations have added much to our knowledge of diphtheria.

2. That diphtheria is caused primarily by the bacillus diphtheriæ of Loeffler, and that therefore we may call diphtheria any exudative inflammation of a mucous membrane, no matter what the character of the exudation may be, where the bacillus of Loeffler is constantly present.

3. That diphtheria and membranous croup are one disease etiologically, and that the clinical differences between the two can be accounted for by J. Ritter's view of polyinfection, and by anatomical differences in the pharynx and larynx.

4. That there are exudative inflammations and affections, accompanied by pseudo-membranous exudations upon the

mucous membranes, which are not caused by Loeffler's bacillus.

5. That early bacteriological diagnosis in suspected cases is of great value in aiding us to prevent infection by isolating the sick from the well, and to institute early and possibly specific treatment; further, that the examination of apparently healthy throats, etc., during epidemics may be beneficial for the same reasons.

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SERUM TREATMENT OF DIPHTHERIA.

By William Cheatham, A. B., M. D.
Louisville, Ky.

Mr. President, I wish to-day to add to a paper I read before the Louisville Medico-Chirurgical Society, January 4, 1895, what has been done on this subject since then. I wish to say here that I shall not attempt to advance any thing new, but to give the members of this association the advantage of the immense amount of writings on the serum treatment of diphtheria that have been placed in my hands. I shall endeavor to give an unbiased report of both sides of the subject, with my own experience and that of others in the city of Louisville.

Much of the profession fail to accept the many favorable reports made as to the result of the serum treatment of diphtheria, most of these believing it will result as the Koch treatment of tuberculosis, seemingly failing to recognize the difference between the two diseases and the effect looked for.

The method of administering the serum is too well known to be repeated here. I must, though, repeat that thorough cleanliness must be practiced. To keep my needles clean I carry them in a bottle of absolute alcohol, with pieces of cork on the points to protect them, and I protect the wound with a piece of iodoform gauze, held in place by an adhesive strip. Just here, also, I must say that cleanliness of the parts affected must be carried out thoroughly; mopping and tearing away of membrane and all rough treatment can be dispensed with and the spray and gargles substituted. All strong medication can be dispensed with, and mild applica-

tions, such as sterilized solutions of salt water and boric acid, used; also weak solutions of hydrogen dioxide and Loeffler's solution.

The serum treatment of diphtheria is not a cure-all. It is yet in its swaddling clothes. The dose is not yet understood; we have time to study the constitutions of very few of our patients, and the susceptibility of none. These are a few of the disadvantages the clinician has yet to overcome in this new medication of one of the most dreadful diseases with which we have to deal.

That we are much mixed in our statistics we must admit. How this can be corrected, time alone can tell. I shall give you now the opinions of two supposed equally good men sent out by two of the branches of our National Government to study this subject of the "Serum Treatment of Diphtheria" and report to their respective heads the result. These are extracts from the Medical Mirror, of St. Louis:

"The best report of the antitoxin treatment of diphtheria has been through the United States Marine Hospital Service. Surgeon-General Walter Wyman having delegated Surgeon J. J. Kinyoun, a skilled bacteriologist, to visit the Pasteur Institute and study thoroughly the work of E. M. Roux, he presents his official report in the weekly abstract published by the Marine Hospital Service, under date of October 20, 1894, and it is indeed the most succinct and reliable article upon this subject that has yet appeared. Too great credit can not be given Surgeon-General Wyman and his subordinate, Dr. Kinyoun, for his report. The essence of the conclusions made by Dr. Kinyoun are contained in the following: 'The results obtained by Prof. Roux in the treatment of cases of diphtheria are so astounding that one is almost compelled to ask one's self, Is this possible? But when the methods are known and the array of statistics are given there can hardly remain a trace of doubt. The future possibilities in this direction can not be overestimated, as we have in the

serum the almost absolute preventive of epidemics of diphtheria.'"

The great Virchow was for a time opposed to this method, but in a recent meeting of the Berlin Medical Society he publicly announced that he had to yield to the brute force of unanswerable facts. A full opportunity was furnished for the comparison of results in a large number of cases in Berlin, when treated with and without the blood serum. Hansmann, Virchow's assistant, still opposes the blood serum, but as yet there has appeared no presentment of facts upon which to base his opposition; at least it has escaped my observation. The reports from London, France, Berlin, and upon this side of the water, are in the affirmative.

The most recent unfavorable report on antitoxin appears in the Medical Record of April 13th, as follows:

"After a thorough study in various hospitals in Berlin of the use of Behring's diphtheria serum, Passed Assistant Surgeon F. J. B. Cordeiro, U. S. N., in a report to the Surgeon-General of the Navy, concludes that so far proof is lacking of the value of antitoxin in the treatment of diphtheria. Dr. Cordeiro adopts the following opinions of Kassowitz:

"'(1) A large number of children treated with both small and large immunizing doses have within a few weeks acquired diphtheria, and some of them have died from it. We do not possess a single scientific proof that a case of diphtheria was ever prevented by the immunizing process. (2) Children who during a first sickness have been treated with large doses of serum have a short time after acquired diphtheria anew. They were not rendered immune either by their sickness or the largest doses of the antitoxin. (3) In a large number of cases children have been treated on the first or second day of their illness with the fullest doses of the antitoxin, and have died. (4) It is certain that a large part of those who have died, notwithstanding the serum treatment, did not die from the effects of a mixed infection, but directly

from the specific effects of the Loeffler bacillus. (5) Heart and other post-diphtheritic paralyses are also seen in early and fully treated cases, and they occur as often as they did before the serum treatment. (6) Of a fever fall by crisis in the first twenty-four hours, and of a pronounced antipyretic effect of the serum, most observers have seen nothing, or next to nothing. (7) The separation of the membrane follows in the cases that run a favorable course in the customary manner. But often there is an extension of the local process, and a renewal of the already separated membranes during and after the serum treatment.'

"The burden of proof lies with Behring and his co-workers. The world will eagerly and only too willingly receive this proof. We know that the former extravagant promises are out of the question, but we should be grateful to have it demonstrated that the serum can reduce the mortality by even one per cent. As yet we have not the slightest basis on which to found an expectation that fewer children will die in the future of this disease on account of the serum treatment."

These are strong words, and rank with those of Hansmann, Virchow's assistant, and must be carefully noted along with other evidence.

Charles J. Kuhlman, M. D., says: "In the Berlin Medical Society, November 28, and December 7 and 12, 1894, Hansmann, Ritter, Benda, Unger, Scholz, Liebreich, Oppenheim, Hahn, Meyer, Gottstein, and others, went on record as saying that 'Antitoxin diphtheria serum did neither render immune nor cure diphtheria as claimed by Behring, but that it complicated said disease by giving rise to serious inflammations of important functionating organs, such as the liver, spleen, heart, kidneys, nervous system, and skin—the direct result of chemic decomposition of the blood." (Journal American Medical Association.)

Again, take the recent discussion in New York—from New York Medical Record, April 20, 1895—in which Dr. Winters,

besides reporting three cases in which there were immediate bad results from the serum injections, two of which died, referring, also, to eight cases of Dr. Lenox Brown, six of whom died of disease of the kidneys, and of thirty-nine cases found by Benda dying under serum treatment, thirty-six of whom died of nephritis, spoke also of a case reported in the British Medical Journal of March 2d, which died on the fourth day; then referred to the case of Miss Valentine, of Brooklyn, which most all of us have read, and of which I will have more to say later. He speaks of a new form of pneumonia as the result of the serum treatment; also said that horse serum dissolved the human blood; and, in summarizing, said:

"I oppose the antitoxin treatment of diphtheria, first, because in an experience of one hundred and fifty-four cases during the months of January, February, and March, 1895, in the Willard Parker Hospital, I have failed to see the slightest evidence that it neutralized the toxemia in a single case. I have never found that it exerted the slightest influence for good in a single clinical manifestation of the disease—on membrane, pulse, temperature, gland swelling, laryngeal symptoms, etc. Every one of these cases has been examined daily; they have been examined with care and with great solicitude, and with a desire to discover some evidence of the virtues ascribed to antitoxin by others. Secondly, I oppose it on account of its immediate danger to life, through its influence on the kidneys and on the nervous system, and remotely through its influence on the blood."

Dr. Somerset, referring to Dr. Winters' remarks as to the mild character of the cases treated at Willard Parker Hospital, said: "That, of course, the hospital was not conducted for the purpose of making statistics for antitoxin treatment, but rather for the purpose of taking care of diphtheritic patients sent there, and, under instructions from the Board of Health, all the cases were, according to the best judgment

of those in charge, treated by antitoxin. Certain cases having been referred to as mild, with rosy cheeks and croupy cough, Dr. Somerset said he could not recognize in a case of croup one of mild diphtheria. As to cases dying within twenty-four hours, he thought that was the rule rather than the exception in cases of croup. As to certain ill effects ascribed to antitoxin, he had been in Willard Parker's sixteen months, and could remember very well that before the use of antitoxin cases occurred in which there were irregular rises of temperature, rashes, and symptoms regarded more or less unfortunate. They were then ascribed to digestive disturbances, while now antitoxin got the whole credit. As to the influence of antitoxin in fatal croup cases, he had compared twenty-four such fatal cases during the pre-antitoxin period with the same number since, and had found that all of the former deaths had occurred within six days, while only half of the deaths under antitoxin treatment had occurred by the sixth day. Without antitoxin treatment membrane was found below the larynx usually, while in none of the autopsies on cases dying after antitoxin treatment had he seen membrane below the larynx. In the first class, if pneumonia developed it was in the first four or five days; in the second, it did not appear until much later as a rule."

Dr. Herman M. Biggs made some concluding remarks. He said: "Dr. Winters had omitted to explain why the mortality from diphtheria, even if nothing were eliminated, was still ten per cent lower than it was last year. Could one who was an unprejudiced observer make the statement that there was little diphtheria of a severe type in New York when the statistics showed there were two thousand eight hundred deaths from the disease for the year ending January 1, 1894? Many statements and many inferences drawn by Dr. Winters were, he said, distinctly untrue. It had been asserted in a very dramatic manner that of septic cases treated in the hospital with antitoxin not one had been improved. In reply,

it had been sufficient to say that from the beginning it had been shown that antitoxin was only of value to neutralize diphtheria toxin; it did not neutralize diphtheria sepsis; it did not neutralize broncho-pneumonia. He would like to know where Dr. Winters' information came from, that there was no absorption from the larynx. Antitoxin did good in croup cases because it neutralized diphtheria toxin; it reduced the inflammatory swelling, and it prevented extension of membrane. In reply to the statement that the statistics were the result of a process of elimination, he would say that no cases were eliminated except those which died within twelve hours, with two further exceptions. Then, too, the statistics from Berlin, Paris, and other cities, all coincided in the fact that the mortality from diphtheria since the introduction of antitoxin treatment had been greatly reduced. All of this could not be explained on the basis of coincidence. Further, it had been repeatedly stated that antitoxin treatment, to be of much value, must be resorted to within three or four days. As to the Willard Parker Hospital statistics, he had accepted them as they had been given him by the staff. He had personally had nothing to do with making them. They were poorer than those made by the inspectors, included in his report. Regarding cases in the hospital without diphtheria, no cases were taken there which had not at least been reported to the department by physicians as cases of diphtheria and in which diphtheria bacillus had been found. So far as his own knowledge extended, none had been injected and included in the report as diphtheritic cases on the basis of the presence of diphtheria bacilli without lesion.

"Dr. Biggs would like to know from whence came the information that horse serum injected in man dissolved the red blood corpuscles. It was a new fact in physiology to him.

"As to the value of a bacteriological diagnosis of diphtheria, every one who had had any considerable experience in the treatment of throat affections long before bacteriolog-

ical examinations had come into vogue agreed that in a certain proportion of cases it was impossible to make the diagnosis of diphtheria; that cases which seemed to be follicular tonsillitis or simple pharyngeal inflammation were sometimes diphtheritic, as shown by subsequent complications. The investigations of the Health Department the last two years had shown repeatedly that persons might have diphtheria bacilli in the throat for a long period of time; that they might infect others long after their own primary attack, and that the latter persons might have violent diphtheria. These were not questions of opinion, but of absolute demonstration. In a communication made by the Health Department more than a year ago it had been distinctly stated that a considerable proportion of normally healthy people who came in contact with persons with diphtheria had diphtheria bacilli in their throats, and that they might infect other persons and might contract the disease themselves. They had not changed their opinion on that point. But they did not send these cases to the hospital.

"Dr. Biggs claimed that Dr. Winters had shown from the beginning of the antitoxin treatment at Willard Parker Hospital profound distrust of the method. In conclusion he would say, that so far as he knew there was not a single distinguished clinician, pathologist, or bacteriologist in Europe who had not accepted the new treatment of diphtheria as the most important advance in therapeutics in modern times."

Here are men who stand equally high in the medical profession giving diametrically opposite results in the treatment of the same disease by apparently the same methods and medication; I say by apparently the same methods and medication, for by this I believe the different results are reached. Dr. Somerset, who was in the same hospital with Dr. Winters, it was observed, gave a most favorable report. Dr. Hansmann, Virchow's assistant, with whom Virchow at first agreed, attacked the method with great virulence, and has never

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relented; but what did Virchow say later: "I must yield to the brute force of unanswerable facts."

As to the Valentine case, of which I spoke, and of which the anti-serum branch of the profession make much, I wish to quote as follows from the New York Medical Journal:

"The Brooklyn case of death after the use of diphtheria antitoxin." We have been asked to publish the following documents:

BROOKLYN HEALTH DEPARTMENT.

Hon. Z. T. Emery, M. D., Commissioner of Health:

SIR: I have the honor to report that yesterday, April 1st, I procured from Schulze-Berge & Koechl two bottles of Behring's antitoxin, No. 2, containing a thousand immunity units, sealed under the date of January 30th, operation No. 159, being a portion of the same lot as used in the case of Bertha Valentine. Of this serum one cubic centimeter was injected beneath the skin of a guinea-pig, weighing four hundred and twenty grams, at 4:30 P. M. The animal suffered no inconvenience from this injection. At the time two and one half centimeters of the same serum were injected directly into the ear vein of a large rabbit. This animal suffered no inconvenience. I also obtained from Dr. Clayland, the coroner's physician, about one ounce of fluid received in a sterilized bottle from the right auricle of the heart. One half of this blood was given to the chemist of the department for the chemical analysis. Direct microscopical examination and cultures from this blood showed it to be free from micro-organisms. Speculative theories may be advanced as to the cause of death in this case, the true cause not having been yet determined, but the above experiment, conforming as nearly as possible to the actual condition, demonstrates that the cause was not inherent in the antitoxin. Sincerely yours,

[Signed] E. H. WILSON, M. D.,
Chief Bacteriologist.

BACTERIOLOGICAL LABORATORY,
NEW YORK CITY BOARD OF HEALTH, April 2, 1895.

This is to certify that, in view of the sudden death which recently occurred in Brooklyn after the administration of Behring's diphtheria antitoxin, and at the request of President Wil-

son, of the New York City Board of Health, in the absence of Dr. Biggs, I obtained from Messrs. Schulze-Berge & Koechl, the American agents for the remedy, two vials of the antitoxin from the same lot, operation 159, as that which was employed by Dr. Kortright in the case alluded to. I have submitted both vials to thorough tests at the bacteriological laboratory of the Board of Health by injecting excessive doses into guinea-pigs and rabbits without producing in the animals any deleterious effects whatever. Specimens of both vials were also submitted to bacteriological tests, and were found to be absolutely free from living germs of any kind. These results, taken together with the fact that the New York City Board of Health has employed this same make of antitoxin in a considerable number of cases with only the best of results, lead me to express the opinion that the unfortunate results which followed its administration in the case referred to can not be attributed in any way to the antitoxin which was employed.

W. H. PARK, M. D.,
Asst'l Director Hospital Bacteriological Laboratory, N. C. B. of H.

It can be further stated that the *post-mortem* showed no cause of death from the serum.

Other cases of death from serum injections have been reported by Johanessen and Alföldi, as extracts from the Medical Record, of New York, show, and many more no doubt not reported. This latter, of course, affects our statistics much; but, admitting all of this to be true, still, as Virchow says, "the brute force of unanswerable facts" makes us yield, and, admitting that there have been many deaths from the use of serum, that eruptions and swelled joints fellow it use, the result in some cases of susceptibility, of poor serum, of uncleanliness in the operator, or from other causes known and unknown; when such men as Roux, Behring, and many, many others too numerous to mention, tell us that, under this treatment, 10,000 people receiving immunity doses of this serum but ten have the disease, although all are exposed; that under injections in thousands of cases, with the same surroundings as of old, with no other change in the treatment except much less local treatment, and with

but little else of the general, the mortality is decreased 10, 20, yes, 50 per cent; and if in the same epidemic serum treatment is stopped and the old treatment used, the old mortality returns, then yields to the serum treatment again as soon as begun, is it not enough to make us hope that at last we have something with which we can combat this fearful disease?

Dr. Lewis Fischer, of New York, in a recent article published in the Medical Record, of April 6, 1895, says: "In the application of the remedy we must consider, therefore: (1) To apply the remedy as soon or as early in the disease as possible. (2) To inject a sufficient quantity. (3) Remember that the remedy given to us is absolutely harmless. (4) That the same can be used for prophylactic purposes by injecting the one-tenth part necessary for healing an acute case of diphtheria. (5) It is well to remark that, although we use antitoxin, the patient still requires local treatment of the infected places with a sublimated solution or other antiseptics; that the question of stimulants and hygienic and dietetic rules must be strictly carried out, and that, in a word, we must not expect healing wonders from this new remedy.

Contra-indications for the use of antitoxin are: "(1) Cases of mixed infection; cases of scarlet fever complicating diphtheria; cases of chicken-pox complicating diphtheria, and so on. (2) Cases that are moribund. (3) Cases that appear to be true septicemia, where we have rather a result of the diphtheria than a real diphtheria to contend with. (4) I found that it was very important to make a careful urinary examination microscopically, and that cases that showed a distinct evidence of casts and large quantities of albumen should not be injected with antitoxin.

"The eruptions which most commonly appear to follow the antitoxin have been varied. Some look like scarlet fever, some appear like measles, some of them look like erythema; seven cases looked like urticaria; nine cases showed purpura

hemorrhagica; where, however, these last purpura spots appeared it was found that coincident with these there was blood in the urine. I found these purpura spots chiefly surrounding the joints, on the face, and never did I find one in a case that received less than 10 cubic centimeters of antitoxin.

"In conclusion, I desire to state that antitoxin should be used early, and believe that, if the rules given above be carefully carried out, it is a safe remedy and can cure every case of diphtheria seen early; and even the most malignant cases should be injected, because I have seen moribund cases that were considered absolutely beyond medical skill get well. I again state, however, that I do not believe it a cure-all, but believe it to be the best known remedy for the treatment of diphtheria in use to-day."

Dr. Edwin Rosenthal, of Philadelphia, in the Medical News, says: "My conclusions drawn from the use of antitoxin are these: The antitoxin is a specific in diphtheria. In early cases—those seen one or two days after infection—no death-rate should be recorded. In laryngeal diphtheria the antitoxin is specially indicated. It should be used in every stage or date of the disease, no matter how late we see the case; its influence can be proved, for cases of laryngeal diphtheria perish from suffocation long before any toxic symptoms could be manifested; for that reason I would strongly urge the necessity of prompt intubation when indicated, even before the injection of the antitoxin is made."

The following extracts show what some of the associations of this country and Germany have done:

"At the recent meeting of the American Pediatric Society, held at Hot Springs, Va., it was resolved that in the opinion of the Society the evidence thus far produced regarding the effects of diphtheria antitoxin serum justified its further and extensive trial."

Vote of the Congress of Internal Medicine upon the diphtheria antitoxin: "At the conclusion of the discussion before

the above congress on the value of the serum-therapy of diphtheria the following resolution was adopted: 'That this meeting is of opinion that no harm had been done to the patients by the antitoxin treatment, that the majority of observers had seen good results, and that the experiments concerning immunization were not yet sufficient, and should be continued.'" (N. Y. Medical Record.)

Some cases of ocular diphtheria, which by the old method of treatment were considered necessarily fatal to the eye, have been treated by serum injection with universal success.

The North American Medical Review says: "The strengths of the various antitoxines differ according to the brand, generally being expressed in what are known as immunity units. An immunity unit is an amount of antitoxin serum required to save a 500-gram guinea-pig from the minimum fatal dose of the diphtheria toxin. The number of immunity units per c. c. gives us a standard strength of our diphtheria antitoxin serum; for instance, $\frac{1}{100}$ c. c. will protect a 500-gram guinea-pig, therefore 1 c. c. would protect 50,000-grams, or 100 guinea-pigs, against the minimum fatal dose. One c. c. of our diphtheria antitoxin serum, which protects 50,000 grams of guinea-pigs, contains 100 immunity units, and would protect an individual weighing 100 times as much as a guinea-pig (about 120 pounds) if the susceptibility were the same. As the susceptibility is not the same, the exact number of immunity units required for each administration must be based upon the results of clinical experience, which show that about ten times as much of the antitoxin is required by the human species, in proportion to the body-weight, as is required by the guinea-pig. The number of units in each bottle, as well as the date of preparation of each marketed product, is fully displayed upon the label attached to the bottle in which the preparation is dispensed."

Coming closer to home, I wish here to speak of our experience with serum treatment in Louisville:

Dr. W. E. Grant has reported four cases, all successful. Dr. Dabney has had eight cases, only one of which was mild, with no deaths. Dr. Ray, six cases, three of which were intubed, with one death, an adult twenty-eight years of age, who died of sepsis and pneumonia. Dr. Taylor, one case on hand now. Dr. Evans, two cases, both recovered; one an adult. Dr. W. B. Pusey, my assistant, fourteen cases, eight of them intubations, all of which recovered. I have had fourteen cases, with fourteen recoveries; forty-eight cases, with one death. I have not heard the result in Dr. Taylor's case.

These prove but little, first, on account of the small number; then, again, all of us have had similar experience under the old treatment. Again, the immunity statistics are defective, as all of us no doubt have seen one case of diphtheria in a large family in which isolation was impossible, and yet have but one case. I have seen such instances often.

In summarizing, then, I believe the serum treatment of diphtheria is a wonderful improvement on the old method; its ease of application, and the little punishment to the patient in the application, and the great reduction of the death-rate under its use must soon convert all doubters; it is not a specific nor a cure-all, and its use is yet in its infancy. We have much to learn yet as to its dose, and especially as to the susceptibility of the patient. Cleanliness of the parts involved by some simple sterilized solution must be secured. Cleanliness at the point of injection and purity of the serum must be insisted upon. I think no physician can be justified in treating a case of diphtheria at this day without serum, provided a pure article is procurable.

SEQUELÆ AND GENERAL TREATMENT OF DIPHTHERIA.

By Thomas Hunt Stucky, M. D., Ph. D.
Louisville, Ky.

The most important sequel of diphtheria is paralysis. It may follow mild as well as severe cases, coming on anywhere from the seventh to the eighth day of the disease to ten or twenty days after the disappearance of the throat symptoms. It occurs in about 10 to 20 per cent of the usual run of cases; and in the more malignant forms 40 per cent of the cases will be affected.

The paralysis may be local, affecting certain muscles, or may be general. The palate is usually affected. It may be limited to the palate and fauces, causing the voice to have a nasal twang and the food to regurgitate; or it may progress, involving the pharyngeal constrictors, producing difficulty of deglutition.

There may be paralysis of the vocal cords, one or both, or in severe cases occasionally the muscular fibers of the bronchi are involved, causing great difficulty of respiration and even fatal syncope.

The organ of special sense most usually affected is the eye. There may be loss of accommodation, strabismus, or ptosis; sometimes vision is temporarily impaired. Both pupils remain dilated and unresponsive to light when both eyes are involved, and uneven when only one is affected. This loss of sight is temporary and transient, disappearing in a few weeks, or at most in a few months. Speech, like the other senses, is not often involved.

The paralysis may be so mild that only the tendon reflexes are lost, or so severe that the patient is completely helpless.

Paralyses of the heart muscle and the muscles of respiration are the most dangerous complications. The heart may become affected during the height of the disease, but most usually during convalescence. Bradycardia and tachycardia have not infrequently been observed in the same patient. Heart failure and fatal syncope may occur at the same time, usually coming on abruptly, sometimes preceded by vomiting if during the fever; and after slight exertion if occurring after convalescence is established.

I remember of losing one case where all seemed to be doing well with the exception of a slow and feeble heart action. I had cautioned the nurse against allowing the patient to exert herself; but she, overcome by the constant vigil, dropped off to sleep in the "wee sma' hours," and the patient, rather than disturb her, raised herself up in bed to take her medicine and fell back dead.

The cardiac rhythm is disturbed, or there are fainting spells. There may be no physical signs other than slight increase in the cardiac dullness and a gallop rhythm, indicating dilatation. These symptoms, says Osler, were formerly ascribed to cardiac thrombosis or to endocarditis. They may be due, according to Mosler and Leyden, to an infectious myocarditis. But in a majority of cases, continues Osler, the symptoms are probably due to a neuritis of the cardiac nerves.

Paraplegia is more frequently observed than hemiplegia.

Diphtheritic paralyses may follow any form of diphtheria. The frequency of this sequence is exceedingly variable in the experience of different observers—according to Sanne, in 11 per cent of a total of 1,382 cases that passed under his observation.

Here, as formerly, pseudo-membranous inflammations are divided into two classes: The name diphtheria is given to

cases caused by the Klebs-Loeffler bacillus, and the name pseudo-diphtheria to all cases caused by streptococci, or possibly other cocci. The great clinical similarity between less-marked cases of diphtheria and pseudo-diphtheria is one of the great objections made to separating them into two groups, the Klebs-Loeffler bacillus and streptococci both having a tendency to produce exudates and pseudo-membranes. The additional fact confronts us that many pseudo-membranous inflammations are examples of mixed infection; in these the Loeffler bacillus, streptococci, and often saprophytic cocci occur together, and so intimately are they mingled that even the smallest particle will contain all forms. In some mild forms the streptococci will be more abundant than the bacilli, and the symptoms will be largely due to cocci; in many examples of mixed infections many of the symptoms, such as swelling of the neck, fetor of the membrane, and the fever may be due to bacteria associated with the Loeffler bacillus. Many bacteriological examinations of cases of both acute and chronic inflammations of the throat, and nearly normal throats, have shown the presence of streptococci and other cocci on the mucous membrane. Thus the streptococci may exist in the throat before infection with the Loeffler bacillus, or they may be carried from a case in which both forms existed in the pseudo-membrane.

The moderate contagiousness of some of the mild cases containing streptococci, and also the Loeffler bacillus, has caused many to deny that they were diphtheria. It is of the utmost importance that an early bacteriological diagnosis in suspected cases of diphtheria be made, for it is an undeniable fact that the diagnosis depends upon the recognition of the Klebs-Loeffler bacillus in culture.

Within the last two years great strides have been made in the treatment of diphtheria by antitoxin. It is not expected that we should enter here into a detailed description of the preparation of the antitoxin for use. The method

consists of the injection of progressively increasing doses of sterile filtrates of virulent cultures, in which toxines have developed, into non-susceptible animals until the defensive power of the blood is augmented to an accepted standard. A flask of two-per-cent beef tea is inoculated with a culture of determined virulence and placed in the incubator at body heat, in order that the toxines may develop. At the end of this period it is removed, filtered, and tested on guinea-pigs. If found to be of standard virulence, the process of immunization is begun by the injection of the smallest dose that is readily tolerated. The injection is repeated about every eighth day, and the dose increased until after three or four months a horse is able to stand an injection of 250 or 300 c. c. and furnishes an antitoxin of value.

At a recent meeting of the Congress für innere Medicin, at Munich, the discussion of this subject brought out an accumulation of evidence in favor of the new treatment for diphtheria. Prof. Heubner, of Berlin, gave the statistics of 3,000 cases treated in Berlin during the year 1894; 1,332 by ordinary methods, with a mortality of 39 per cent; 1,390 by the serum, with a mortality of 21 per cent, and 207 cases of his own, 26 of which were complicated, with a mortality of 13 per cent, or 10 per cent if the complicated cases were not included.

An interesting feature of the report was an account of the modifications induced by antitoxin in the disease. Ordinarily diphtheria is characterized by a rise of temperature for one or two days, then a fall, then a new rise of temperature corresponding to the laryngeal symptoms. With antitoxin, in his cases, the second rise did not occur, and the improvement in the local symptoms was manifested earlier. The false membrane is more readily detached by the use of the serum, and the extension to other parts prevented. This explains the effect of early injections upon the prognosis, the mortality in Prof. Heubner's personal practice being almost

nil when the serum was used on the first day; 4.6 per cent in those treated on the second day, and 16 per cent when treated on the sixth day and later. Prof. Baginsky reported 525 cases treated by the serum, with a mortality of 15 per cent, instead of 41.9 per cent obtained in his clinic by other methods from 1891 to 1894. The clinical evolution of the disease seemed to be much milder when the antitoxin was used, and the general health of the patient was better. He had also made prophylactic injections in 124 cases, not one of which contracted diphtheria, although exposed. He also noticed a decided modification of the heart symptoms in the cases treated by antitoxin, the death-rate from cardiac causes being only 0.6 per cent, while previously it had been 26 per cent. Intubation could be more readily performed, and tracheotomy became almost unnecessary. The serum had no effect upon the kidneys, and phenol was not observed in the urine. Paralysis was more frequent than before, probably because more children lived through the disease. The principal objection being urged against the antitoxin treatment appears to be due to the untoward effects it has upon the kidneys in some cases, to which the attention of the profession was first called by Prof. Drasch, of Vienna. He admits that the time for observation has been, as yet, too limited to admit of a final settlement of this point.

The most noteworthy feature about the antitoxin treatment is that no one pretends to know any thing definite or indefinite about its composition, and no one has undertaken to present an analysis. Ten years ago this oversight would have been of little moment, but to-day, with all our laboratories built and equipped for all the complicated tests known to physiological chemistry, there is not a single human being on either hemisphere who has any idea of the constitution of a remedy which is now used not less than a thousand times a day. It will not be out of place here to say that the medical profession should remove the "mote from its own eye"

before prating of the gullibility of the public in swallowing unknown drugs. It must be evident to those who have given the subject even a cursory examination that the antitoxin must contain some unknown substance beside nuclein or alexin, and that this unknown substance must be something which acts as an irritant.

While the preponderance of evidence seems to be in favor of the use of antitoxin in the treatment of all cases, not only of true but of pseudo-diphtheria, it is well, in the light of past experience with the Brown-Séquard mixture, the Koch consumption cure, and other remedies, to be very careful before believing that we have a specific antidote for the diphtheria poison. While using this agent it must not be forgotten that it is necessary not only to continue the local treatment, but to resort to the old recognized treatment, which can be summed up in one word—supportive.

For a long time the profession believed that by the use of bichloride of mercury in large doses we had a specific. It was ultimately proven that, while these cases were not ptyalized, it was due to the impairment of the absorptive power of the stomach, and the mercury was eliminated as mercury. If there was a good effect manifested, it was due to a strictly alterative action of the drug.

In conclusion, the treatment of diphtheria may be summed up under the following heads: First, Prophylaxis, the prevention of diphtheria; second, the hygiene of the sick-room; third, local applications, which may be useful when administered for cleansing purposes to dissolve the false membrane or to allay irritation, the most serviceable being those whose object is the disinfection and cleansing of the infected surface, thereby making them less liable to beget infectious substances for absorption; fourth, the hypodermatic injection of antitoxin.

Local treatment is of little value as a curative measure when the lesion is once established. Gargles are useless. Of

the local applications, pyrozone in three-per-cent solution has given me best service; surgical treatment, such as intubation and tracheotomy; treatment of special symptoms, such as paralysis of the pharyngeal muscles. For the paralysis, strychnine and other tonics are of service; massage or a mild electric current may be used. Most cases, however, recover of themselves.

If there is cardiac weakness, absolute quiet in the recumbent position must be strictly enjoined, and strychnine and brandy given hypodermatically, with ammonia or camphor-water internally. If temperature is high, the sponge bath or hot pack will be useful. The hot pack is especially useful when dyspnea is threatened. The coal-tar products should be avoided. Stimulants and cardiac tonics should be given early in the disease and constantly. There is more hope of preventing heart failure than counteracting it after it is manifested. Strophanthus, digitalis, strychnine, camphor, and alcohol are the remedies most in favor. The citrate of caffeine, when the urine is scanty, is useful for its diuretic as well as cardiac effect. Alcohol is demanded early in nearly all cases. Infants tolerate brandy well. When there is difficulty in swallowing, brandy may be administered by the rectum. I believe it is advisable to mix it with peptonized milk, and to carry it into the colon by means of a catheter. Half an ounce of brandy in a little peptonized milk may be given every three hours to a child five or six years old. The diet should be light and nutritious during the early stage. When there is difficulty in deglutition the diet should be fluid, or semi-solid if more easily swallowed, and consist of broths, beef tea, egg albumen, egg-nog, milk punch, etc. Ice-cream, as a rule, is well borne. During convalescence iron and bitter tonics are required, and it is well to add a digestive ferment. It is especially important to impress upon the parent the danger of any exertion on the part of the little patient. After recovery the patient must be sponged with a disinfectant solution, and should have the hair thoroughly shampooed.

DISCUSSION.

DR. J. Y. OLDHAM, Lexington: In discussing these papers on diphtheria I feel that there is nothing I can add to what has already been said by the gentlemen in their respective contributions. They have covered the ground in its every detail and have brought the subject up to date.

Dr. Bailey's paper on sanitation was very interesting, and his ideas should be fully carried out in the sick-room. There is nothing of greater importance than strict hygienic measures in the prevention of the propagation of this disease, for it has been fully shown that this little germ is one of wonderful vitality, and unless we use great care it will continue its deadly work.

Dr. Weidner, in his paper, has given us the most recent investigations of the most prominent men in regard to the bacteriology and pathology of the disease.

Dr. McClure's paper on the treatment and diagnosis of the disease is one of great interest, for nothing is more important than that of early diagnosis, as well as a correct diagnosis, for on this depends the treatment by proper remedial measures, as well as the prevention of the propagation of this disease. If the disease be not diphtheria it should be known, so that needless treatment may be prevented. In a good many cases the diagnosis is easy, but after twenty-four hours an accurate diagnosis is not so quickly made. Whenever a physician is called to see a patient, and there has been diphtheria in his neighborhood, it should be his duty to make a careful inspection of the fauces and posterior surface of the Schneiderian membrane. In the laryngo-tracheal diphtheria the diagnosis is often delayed, and the patient dies without any visible membrane unless the laryngoscope be used. The discovery of the Klebs-Loeffler bacillus enables us to make an accurate diagnosis.

Dr. Stucky has given you in full the general treatment, as well as the sequelæ, and to the general practitioner I would say, use every precaution and every hygienic measure about the sick-room. But make an early diagnosis if possible; give your patients sufficient nourishment to sustain them, and use locally a spray of hydrogen peroxide, 1 to 12 or 15, and give them hypodermatically the serum treatment.

DR. S. G. DABNEY, Louisville: As Dr. Oldham has said, there

is very little that we can add of value in discussing the papers that have been read. But from recent discoveries there are two things fairly well established, and one is that the Klebs-Loeffler bacillus is a valuable agent as affording positive proof of diphtheria, and the other is the value of the treatment by serum injection in a large proportion of cases. A few words in regard to the value of the Klebs-Loeffler bacillus in diagnosis. Not only in the diagnosis of the ordinary pharyngeal cases has it been of great satisfaction, but it seems in a large measure to have cleared up a disputed question as to the true nature of so-called membranous croup. If we have faith in the Klebs-Loeffler bacillus as a diagnostic agent, then we must believe that membranous croup in the vast majority of cases is really diphtheria.

According to the investigations of the New York City Board of Health in their bacteriologal department, twenty-eight out of thirty-two cases which were examined of membranous croup contained the Klebs-Loeffler bacillus. One other point besides the question of diagnosis in ordinary pharyngeal cases is of practical importance, that is, how long should patients be isolated after the subsidence of all clinical symptoms? Perhaps the average physician would say two or three weeks, and most likely in the great majority of cases such a procedure would be safe; that after two or three weeks the Klebs-Loeffler bacillus would not likely be found or continue its activity. Bacteriological examination, however, has shown that it may continue as late as nine weeks; so it is important for us to use this method of investigation after the attack as well as in the beginning of it.

A word or two about Dr. McClure's prodromal stage of a few days. It has not been my experience that patients with diphtheria suffer from catarrhal sore throat for a few days before the beginning of the exudation. It seems to me the exudation may be seen as a thin, delicate, whitish membrane, usually within twelve or twenty-four hours after the first appearance of the symptoms. I believe this exudation is often overlooked because it is in the naso-pharynx, which is difficult of examination, and sometimes it is impossible to make an examination for it in children.

A word also in regard to the value of the application of peroxide of hydrogen in diagnosis. I can not think it is a valuable agent in this particular. I believe the same frothy vomiting that

we are all familiar with, as produced by the peroxide of hydrogen in true diphtheritic membrane, will be produced in other membranous formations in the throat.

Another point that we must be very careful about is in accepting statistics as to the value of treatment. To judge by the reports in our journals and text-books diphtheria is far more severe in Germany than it is in the United States, and I believe it has been more fatal in the last few years in the Eastern States than it has been in Kentucky, and it must be admitted from many of the reports we get that the mortality under the serum treatment is almost as large as we had before the use of the serum treatment.

Passing on to the use of this modern discovery of which we are so hopeful, Dr. Cheatham referred to the fact that there was a vast difference between the use of tuberculin or Koch's lymph in tuberculosis and the use of antitoxin in diphtheria, and as one of the differences he mentioned, if I understood him correctly, that in the use of Koch's lymph we expected a reaction of some severity, at first rather unfavorable, and one that would not be expected in the use of the antitoxin. In my own experience, in eight cases in which I have used the agent, reaction has always been favorable. The cases have all recovered. They were cases that were diagnosed as diphtheria, both by the clinical as well as microscopical appearances. And right here I desire to make another point, that is, I believe our prognosis must be based as well chiefly on the clinical appearance of the throat as from the diagnosis which may be determined by microscopic examination. The cases of microscopic diphtheria, without the clinical appearances of it, generally recover in a few days. The statistics of the use of serum treatment based on the influence of microscopic examination are to be taken with caution, because such cases frequently recover in a short time without any treatment whatever. I do not wish to be understood as underrating the value of the serum treatment; I believe it is the most important discovery in modern medicine, but our statistics must be accepted with some caution, and that point was brought out by Dr. Weidner's criticism.

With regard to the method of administering the antitoxin, cleanliness and antiseptics are of great importance. I would have the part where the antitoxin is to be injected, whether it be the

shoulder-blade or thigh, washed carefully with soap and water, then with a solution of bichloride of mercury. The syringe and the needles to be used in injecting it are boiled thoroughly. The wound is covered immediately after the injection with a little piece of iodoform gauze, fastened on to a strip of adhesive plaster. I have never seen abscess follow it, nor any decided local soreness. There is some pain about the point of injection; and I observed quite recently in one of our medical journals the suggestion that local anesthesia in a measure might be brought about by the application of ice to that part where the needle is to be inserted.

The value of the serum treatment in the laryngeal form of the disease seems as great as it is in the other form, so far as our statistics go. At first sight it would appear contradictory in regard to what we know of this method of operation. We usually think of laryngeal diphtheria as destroying life by obstruction to respiration, and the serum treatment is intended to prevent or to allay toxic symptoms. I think I may allude to one case in which I have used the serum treatment for laryngeal diphtheria without intubation. Dr. Vance, who is present, called me to see a child who was suffering from marked laryngeal obstruction. He was quite sure that the case was one of diphtheria, and as the case was outside of his province or specialty I was called an hour or so later. I found the fauces covered with diphtheritic membrane, and the child having a typical obstruction of the larynx. It was twelve o'clock at night when I injected serum into the child's thigh, watching it very carefully, and having my intubation instruments at hand to insert a tube if necessary. The next morning, twelve hours after the injection, the child was about the same. But twenty hours after the injection a decided improvement was noticed, and the child progressed favorably, and a complete cure resulted in three or four days without need of intubation.

DR. JOHN A. LARRABEE, Louisville: In the first place I desire to say that the papers, together with the discussion on this subject, to which I have listened with pleasure to-day, are fully up with those in any part of the world, so far as I have been able to read and note, and the ground taken in the papers, as well as by the participants in the discussion, is not too sanguine, as we find sometimes in the treatment, but it has been

sufficiently conservative to suit the most fastidious. Therefore these papers are necessarily good ones; they are candid contributions, and the discussion has been led by those who have had personal experience with the various methods in the treatment of diphtheria; hence its value.

Now, in regard to the first paper, which was being read when I came in by my friend and colleague, Professor Bailey. I think he has summed up in that paper very briefly the points of interest and importance. It seems to me that, in our great ardor to treat and cure disease, we are liable to forget the importance of its prevention, and, if I understood his paper correctly, it was bearing principally upon the prophylaxis and sanitation of the disease. This seems to me to be a factor fully equal to the etiological one, and I think by carrying out definite rules we can do much toward the prevention or eradication of this disease, and I hope the further discussion of this will bear more upon that point than upon any other, as it seems to be one of necessity. This disease is preventable to a large extent, and by having definite rules and observing ordinances for its prophylaxis we can accomplish a good deal.

As to the treatment of diphtheria by serum, I believe it is not quite a hundred years since Jenner closed the very gate of death in the presence of smallpox. He made a discovery: he did not know what he had found. He made a discovery of fact, that vaccination would prevent smallpox, and exterminate it entirely if properly practiced. This fact we can no longer doubt. He closed the gate of death in the presence of the disease, and it has remained closed from that time until now. He did not make three kinds of vaccination either. He did not consider number one, two, and three, but he discovered that the introduction of a certain material (not necessary to describe here) would prevent smallpox. Now comes the introduction of serum, which is from a supposed immunized animal. We have no evidence at all that a person is immunized by this treatment. Many of the observed effects of the serum treatment are heterogeneous; that is to say, the effect is from toxines which are not antidotal, and all the discredit cast upon the serum treatment has been due to the lack of its ability as an immunizing agent, eliminating from it certain toxines. With reference to the reaction following it, as referred to by one of the speakers, we all thought, why we did not know,

that the higher reaction we got the better. We were satisfied only to get up fever. This rebuttal evidence is not an indication of its antidotal property, but of contamination of that with other agents which are antitoxines. Start with this fact, that an immunizing agent, if placed upon the spores of this disease, will destroy that germ alone of which it is the toxin. It is all based upon one law that we have discovered, namely, that the poison is generated by the germ itself. I think we are asking too much from antitoxin as it is. If you go to a case of smallpox on the fifth or sixth day of the disease, you would not say to the patient, "I will vaccinate you and prevent you from having smallpox." You know it can not be done. If you go to a man exposed to the disease, even if he has the initial symptoms, you can vaccinate him and say, "You shall not have smallpox." It is reasonable to suppose that the longer the continuation of the disease the less the effect of the serum. There is not the immunizing property in it, and I do not know that it will ever be claimed that with the serum treatment we can have absolute immunity. The immunity lasts as long as convalescence from the disease lasts. Take a man who has had smallpox, and you may immunize him from that disease for a long time, with exceptions of course. There is no comparison between the immunizing power of the disease itself in smallpox, in measles and scarlet fever, and that of antitoxin in diphtheria, because in the one there is a temporary action of the disease which is antidotal while the germ is present; in the other, there is a molecular change in the cellular structure itself which destroys cell life.

In summing up my remarks as to what we know with regard to the serum treatment to-day, I will say this, that the practitioner who does not with our present knowledge give his patient the benefit of antitoxines is guilty of neglect. He is neglecting his patients, if he does not place them under this treatment. It is not essential that he should cure every case. This immunizing power has been illustrated in my own practice very well.

DR. JOSEPH M. MATHEWS, Louisville: I rise simply to say, that at the last meeting of the State Board of Health of Kentucky a resolution was passed authorizing the purchase of tubes, serum, and mops, to be furnished any doctor in Kentucky who would apply for them. We recognize the fact that the diagnosis in diphtheria can be made only in one way, and that is by a bacteriological examination. These tubes are to be furnished to each County Board, bacteriological examinations made, and

answers returned to the doctors; the antitoxin to be supplied to every physician at cost price. We feel that this will be of great service in Kentucky, costing the profession nothing, and the Board hopes and wishes that in the event of an epidemic or even a single case coming under the observation of any physician, he will avail himself of this offer by the State Board.

DR. CARL WEIDNER, Louisville: I desire to say a few words, in closing, with reference to the local treatment in diphtheria. If I rightly understood them, Drs. Stucky and Cheatham, and possibly Dr. McClure, simply spoke of the use of cleansing agents. Permit me to say, that even if we accept the statement that serum is a specific remedy for the specific disease which is caused by the Klebs-Loeffler bacillus, I still have good reason for using energetic local treatment. We know that most of the cases of diphtheria that we meet with are primarily caused by the bacillus of Loeffler; we also know that the majority of cases are cases of mixed infection; that diphtheria stands in the same relation as does the disease which has been repeatedly mentioned, tuberculosis. No one to-day doubts that the tubercle bacillus of Koch is the specific micro-organism of tuberculosis. We also know that we have in some cases fever, a large amount of fetid expectoration, cough, etc., due not to the tubercle bacillus, but to other micro-organisms, as staphylococci and streptococci. I would like to have heard what the gentlemen had to say about Loeffler's remedy. My own experience with Loeffler's solution, which he recommended last fall, has been satisfactory. It is an antiseptic solution made of toluol, 36 parts; menthol, 10 parts; alcohol, 60 parts, and 4 cubic centimeters of liquor perchloride of iron. In this we have an astringent and a slightly cauterizing agent. I have used it in one or two cases of diphtheria, and in other forms of sore throat, as follicular tonsillitis, with marked benefit.

In an article which I read some time ago on the bacteriological relations of croup and diphtheria it was claimed that they are both one and the same disease. Other writers take the position that this theory is incorrect, and that there is a possible co-effect of the streptococcus pyogenes upon the infection produced by the diphtheritic bacillus. In Loeffler's opinion the constant effect of the bacillus of diphtheria is to cause very violent inflammatory reaction of the mucous membrane, which, in the laryngeal or tracheal mucous membrane, responds by throwing out a fibrinous exudation and nothing else. In the pharyngeal mucous membrane we have more marked cellular

infiltration from the start, and with the secondary development of streptococci in the tissues there is produced deeper necrotic masses. The fact of the streptococci penetrating the mucous membrane of the pharynx and larynx explains why a fibrinous exudation is thrown out. By an experimental inoculation of the mucous membrane of rabbits and guinea-pigs he has determined that there will be and is a fibrinous exudation thrown off.

DR. W. B. MCCLURE, Lexington: With reference to the point touched upon by Dr. Dabney, I intended to say that the prodromal stage lasts for a short time, and not for a few days. There is unquestionably a prodromal stage which lasts from ten to twenty hours, resembling very much pharyngitis or tonsillitis, according to the location.

As to Dr. Weidner's criticism, that we are not using local applications sufficiently in the treatment of diphtheria, I must confess that he has been more fortunate than myself if he has found any thing in the nature of a local application which cures to any degree a true case of diphtheria.

DR. WM. CHEATHAM, Louisville: In reference to the remarks made by Dr. Bailey concerning the use of antiseptics, I would say that sulphur is one of the best cleansers we have if properly used. The dry fumes of burnt sulphur will not destroy the germs of this disease; at the same time I put in a wash-tub, half full of water, a few lumps of unslacked lime.

Dr. Dabney spoke of the prognosis, saying that bacteriologists assist us very little, and that we had to make our prognosis largely from the appearance of the throat. I do not think we can prognosticate very much from the throat unless the larynx is involved. I have seen the whole pharynx and tonsils covered with diphtheritic membrane, and yet there was very little constitutional disturbance or symptoms. We may have death from diphtheria without the formation of the membrane at all, and *post-mortem* examinations have conclusively demonstrated this. The symptoms of diphtheria are very uncertain. We may have in severe cases no temperature at all, usually a subnormal temperature, showing that nature is making no response, and we are apt to have fatal results. In other cases the temperature runs high, and we expect a greater mortality in these cases than in those with subnormal temperature. So the symptoms of disease are extremely uncertain.

REMARKS ON CHLOROSIS AND ITS TREATMENT.

By Frederick P. Henry, M. D.
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The term chlorosis is derived from the Greek word χλωρός, which means greenish-yellow. By a slight stretch of the imagination the skin of a person of dark complexion suffering from chlorosis might be called greenish-yellow; but chlorosis is very common in Sweden, where the inhabitants are, as a rule, of very fair complexion, so that the very name of the disease is to a certain extent a misnomer. It has, however, the sanction of the ancient usage, and it would be hard to find another to which even greater objections could not be raised.

Etiology. The chief predisposing causes of chlorosis are to be found in age, sex, and constitution. The forces emanating from these sources come to a focus, so to speak, in a case of chlorosis, and that which brings them to a focus is the advent of puberty. The principal of these predisposing causes is, I believe, a congenital tendency to anemia. Some years ago, while examining the blood of the new-born at the Maternity Hospital, I discovered an infant whose red blood-corpuscles numbered only 3,625,000 per cubic millimeter, the normal average being at least 5,000,000. Now, this child, which by the way was a female, might, under proper care, thrive until the age of puberty, when the demands made upon the blood and nervous system by the evolution of the sexual system would, in all probability, give rise to well-marked chlorosis. The chief predisposing causes of chlorosis then are: (1) Sex, the vast majority of cases occurring in females. (2) Age, the decade between fourteen and twenty-four years

furnishing all the cases. (3) Constitution either inherited or acquired.

Exciting Causes. The exciting causes of chlorosis are those of anemia in general, such as insufficient food, light, air, and exercise, overwork, either physical or mental, anxiety, grief, and nervous excitement in general. There is another exciting cause on which great stress was recently laid by a distinguished physician of London, the late Sir Andrew Clark, and which therefore deserves to be considered at some length. The cause to which I refer is constipation, and Clark considered it of such paramount importance that he used the term fecal anemia as a synonym of chlorosis. This theory of Clark was based upon certain signs and symptoms that are more or less commonly encountered in chlorosis. Chief among them are digestive disturbances. The tongue is generally heavily coated at the base, large, flabby, and with its sides indented with the teeth. The breath is disagreeable, and sometimes, according to Clark, has a distinctly fecal odor. There is a sense of epigastric oppression after the ingestion of food. The bowels are either confined or inadequately relieved, and the feces generally consist of scybalous masses embedded in mucus swarming with bacteria. Pain in the side, generally most marked on the left, is a common symptom, and was believed by Clark to have its seat in either the hepatic or splenic flexure of the colon. This view of the nature of the pain in the side is corroborated by the fact that it is sometimes relieved by large enemata of warm water. According to the authority just named, it is a common thing for young girls to neglect the calls of nature so far as the bowels are concerned. The feces accumulate, and by their decomposition ptomaines and leucomaines are generated, absorbed, and by their poisonous action produce the multiform symptoms of chlorosis. A treatment based upon the theory that chlorosis is due to fecal retention is sometimes eminently successful, and will be referred to later in detail.

Another exciting cause of chlorosis is cold. Prof. Augusto Murri, of Bologna, has recently published an elaborate paper on the influence of cold in the etiology of chlorosis. He gives the notes of three cases in which the symptoms of chlorosis were limited to the cold months of the year, disappearing in summer and recurring on the onset of the succeeding winter, and he states that others precisely similar have come under his observation. He therefore styles them "winter chlorosis," or *chlorosis hiemalis*. It is well known that chlorotic patients are affected unfavorably, as a rule, by such exposure to cold as is well borne by the healthy, and this Murri believes to be due to an instability of the vaso-motor system on the part of the former. In fact, he regards chlorosis as a vaso-motor neurosis, the blood changes in the disease being dependent upon disorders of the circulation induced by cold, nervous shock, or long-continued irritation, as from the genital organs. This paper is certainly a most suggestive one, teeming with facts and giving evidence of a thorough knowledge of the circulation in its healthy and diseased states. It is impossible to discuss it at length. Suffice it to say that it deserves the careful study of all hematologists.

Meinert, of Dresden, claims to have demonstrated a displacement of the stomach (gastroptosis) in sixty consecutive cases of chlorosis. Fifteen per cent of the cases were complicated with right movable kidney, and in one both kidneys were movable. The gastroptosis is secondary to enteroptosis, and this in turn to the pressure of the corset, so that, according to Meinert, it is to this article of female apparel that chlorosis is indirectly due. After the cure of a case of chlorosis, its anatomical substratum, the visceral displacement remains, and hence the notorious tendency of the affection to relapse. No one doubts the evil effect of tight lacing, and all will admit that, in an individual predisposed by inheritance or otherwise to chlorosis, the development of the disease may be accelerated by constriction of the thoracic base and consequent displacement of viscera.

It is scarcely necessary to add that there are those who regard chlorosis as an infectious disease. Among these are Clément, of the Hôtel Dieu, Paris, who bases his opinion of its infectious nature on the enlargement of the spleen, which he has found in thirteen cases, on the frequency of febrile movement, the occasional complication of phlegmasia dolens, and the epidemic occurrence of the affection. The hypothesis is well argued, but the facts on which it is based are questionable.

Anatomical Characters. From the fact that there is such diversity of opinion concerning the etiology of chlorosis it may almost be inferred that the anatomical characters of the disease are by no means uniform. Virchow endeavored to place the affection upon a distinct anatomical basis by the demonstration that, in fatal cases, there is often found an imperfect development of the aorta and arterial system generally. He has found the aorta of a full-grown woman so small as barely to admit the little finger, whereas normally it should admit the thumb, and with this contraction of the lumen of the vessel its coats were found to be much thinner than normal. He regards this condition of the vessels as congenital, and the importance of the observation depends upon the fact that the blood-vessels and the blood-corpuscles are both derived from the same embryonic layer—the mesoblast —an imperfect development of the one necessarily entailing the same condition in the other. I have little doubt that Virchow's theory is true with reference to some of the cases, especially those that run a fatal course. A condition of imperfect development of the vascular system might doubtless give rise to grave disturbances of nutrition which would eventually end in death, but chlorosis is not as a rule a fatal disease, the great majority of cases under appropriate treatment ending in recovery, and with reference to them there is no proof that such a stunted condition of the blood-vessels is present.

The only constant anatomical characters of chlorosis are those of the blood itself, and it is for this reason that I classify the disease among the primary anemias. Even the blood changes are not uniform. The researches of Duncan, in 1867, first established the fact that in well-marked cases of chlorosis the number of red blood-corpuscles might be normal while their percentage of hemaglobin might be greatly reduced, and this anomaly was for a long time regarded as the distinguishing mark of chlorosis. It has since been established that this view of the blood change in chlorosis is altogether too narrow, and at the present day it is generally admitted that the changes in the red corpuscles may be at least threefold. (1) They may be of normal size and number, their only change being a deficiency of coloring matter. (2) They may be diminished in number with diminished percentage of coloring matter. (3) They may be diminished in size and normal in number and in percentage of coloring matter.

Of the above-mentioned varieties the second is the most severe, and in it there are often marked changes (poikilocytosis) in the shape of the red corpuscles, such as are commonly observed in pernicious anemia.

From these facts you will perceive that there is nothing uniform in the behavior of the red corpuscles in the disease called chlorosis, so that an attempt to describe it as a distinct disease from an anatomical standpoint must result in failure. The essential point is that the percentage of hemoglobin is reduced in this affection, and this is common to many forms of anemia.

It has been contended by some writers, especially by Immermann, that chlorosis differs from all other forms of anemia in that the albuminous bodies of the blood-serum are present in that fluid in normal or increased amount. This has certainly been proved to be true in a few cases by chemical examination, but it has not yet been proved that the same may not be true of other forms of anemia.

From the foregoing remarks it appears to me evident that the conditions of the blood and the other organs of the body are so various, not to say contradictory, as to veto the present establishment of chlorosis as a distinct disease. With advancing knowledge some etiological or pathological fact, common to all cases of the affection, may be discovered, but at present none such is known.

With our present knowledge, the most sensible view of the nature of chlorosis appears to me the following, which I have already expressed elsewhere: * At the time of puberty there is an urgent physiological demand upon the blood, which is complied with by vigorous individuals without detriment to the organism. The ordeal of puberty is safely passed. In less vigorous, but still sound, healthy organisms, a decided degree of anemia, one calling for treatment, declares itself at this time. Finally, in those with any congenital tendency to anemia, whether this may have been due to general malnutrition during intra-uterine life or to a special hypoplasia of the vascular system, the anemia of puberty is intense; the case is a typical one of chlorosis.

Complications. There are certain diseases to which chlorosis stands in the relation of a predisposing cause, and which therefore may be regarded either as complications or sequelæ. The chief of these are phthisis, gastric ulcer, chorea, and exophthalmic goitre.

There can be no doubt that one of the best prophylactic means of averting phthisis pulmonalis is the maintenance of a good condition of the blood, and, conversely, that a poor state of the blood is often a pre-tubular or pre-bacillary stage of phthisis. Gastric ulcer is by no means uncommon in chlorotic women, and its occurrence is favored by degenerative changes in the blood-vessels of the stomach leading to thrombosis and hemorrhage as well as by the hyperacidity of the gastric juice, which recent researches of Lava, of Turin,

*Anemia, by F. P. Henry, Philadelphia, 1887.

Cantù, of Pavia, and Osswald, of Germany, have shown to be the rule in chlorosis.

Chorea, it is well known, is decidedly more common in females than in males, and, although more frequently observed under than over fifteen years of age, is yet far from rare between the ages of fifteen and twenty. Its occurrence is undoubtedly favored by chlorosis, and the same is true of that peculiar neurosis known as exophthalmic goitre or Graves' disease.

Omitting, for the sake of brevity, any further remarks on diagnosis and prognosis, I will conclude with some observations upon the treatment of chlorosis.

Treatment. As Immermann remarks, "there is scarcely any point in therapeutics so fully established as the remarkable efficacy of iron in removing all the symptoms of chlorosis," but it does not follow that iron should initiate the treatment in every case. Nearly all chlorotics are dyspeptic, and until the digestive disorder is relieved the full benefit of iron can not be obtained. In cases of atonic dyspepsia the simple bitters, such as quassia or gentian, or exciters of the smooth muscular fibers, such as strychnia or brucia, may be administered before meals, or, if there is gastric dilatation, naphthol, salicylate of bismuth or chloroform-water may be given three or four hours after meals, as recommended by Le Gendre, in order to limit or stop the abnormal fermentations generally present in that condition. Hyperacidity of the gastric juice should be treated with full doses of alkalies—soda, chalk, or magnesia—from one to two hours after meals, and anacidity with dilute hydrochloric acid immediately after eating.

According to Dr. Haig, of London, who has done so much to advance our knowledge of lithemic conditions, "iron cures anemia by clearing the blood of uric acid." When iron fails to cure chlorosis, he recommends its suspension and the administration of mercurials and salicylates until the blood

is cleared of uric acid, after which improvement may occur even without the resumption of the iron.

There has been much discussion concerning the *modus operandi* of iron in chlorosis. A study of a few cases of chlorosis, perhaps even of one, will lead any reflecting physician to the conclusion that the cause of chlorosis is not a deficient supply of iron, but something that interferes with its assimilation. To begin at the beginning, we find that in mothers' milk there is more iron than is necessary to supply the wants of the new-born child, for distinct traces of the metal are found in its excrement. This also proves that the amount of iron necessary to maintain the normal composition of blood is very small, for there is but a minute quantity of the metal in human milk. Nearly all our food substances contain iron, and there is probably no drinking water in which traces of it can not be found. It is evident, therefore, that there is something which interferes with the digestion and assimilation of the iron, which is abundantly present in the food of chlorotic individuals.

Until quite recently no satisfactory explanation could be given of the efficiency of iron in chlorosis, and especially of the necessity of administering it in large doses, for it was known that very little of the drug was absorbed. Nearly all the iron given by the mouth can be recovered in the feces, and therefore it would appear that a large portion of the drug is wasted, and that equally good results might be obtained by its use in small doses. This, however, is not the case, and thanks to the investigations of a German chemist, named Bunge, we have at the present time, at least, an idea of the mode in which iron is so efficacious in chlorosis.

In the first place our food, which contains all the iron we need, does not contain that metal in inorganic form, but in an exceedingly complex organic union. Now, in chlorosis, as is so emphatically insisted upon by Sir Andrew Clark, digestive disturbances are exceedingly common. Abnormal

fermentations and decompositions take place in the gastro-intestinal tract which give rise to the formation of quantities of sulphides. These decompose the iron contained in the food and completely unfit it for the purposes of nutrition. By administering an inorganic preparation of iron we protect the organic combinations of the metal in the food, for the sulphur in the intestine combines with the iron administered, and allows that normally contained in the food to be absorbed. This theory of Bunge also explains why it is sometimes necessary to administer colossal doses of iron, for in such cases the decompositions in the intestine are unusually active; sulphur is formed in large quantity and requires a proportionally large amount of iron to take it up.

It is only proper to add that Bunge's theory has lately been contested by Ralph Stockman, of Edinburgh, who claims to have cured cases of chlorosis by giving them sulphide of iron, and who contends that bismuth, manganese, and other drugs which are just as capable of absorbing sulphuretted hydrogen as is iron, are inert in chlorosis. Stockman, however, acknowedges that the promptest curative effects are obtained with inorganic preparations of iron. On the other hand, Forchheimer, of Cincinnati, believes in the therapeutic virtues of intestinal antiseptics in cases of chlorosis, and my own opinion is in favor of their efficacy.

There has been a good deal of discussion as to the relative merits of organic and inorganic preparations of iron, and there can be no doubt that both are effective. The protoxalate is a favorite salt of certain eminent French practitioners, while others claim that the best results are obtained with the sulphate. For my own part, I am accustomed to place the most reliance on the inorganic salts of iron, although I have obtained good results from both the malate and the lactate.

In conclusion I will describe the method of treatment so strongly recommended by the late Sir Andrew Clark.

With careful attention to the diet and a tepid sponge, both

followed by brisk toweling night and morning, he prescribes the following mixture, to be taken twice a day:

℞ Ferri sulphat., ... gr. xxiv;
Magnes. sulphat., ... ʒ vi;
Acid. sulph. aromat., ... ʒ i;
Tinct. zingib., ... ʒ ii;
Infus. gentian comp. vel quassiæ, ... ℥ viii. M.

Sig: One sixth part twice daily, about eleven and six o'clock.

"Occasionally this acid mixture produces sickness, dries the skin, and is otherwise ill borne." In such cases he prescribes the following alkaline mixture:

℞ Ferri sulphat., ... gr. xxiv;
Sodi. bicarb., ... ʒ ii;
Sodi. sulphat, ... ʒ vi;
Tinct. zingib., ... ʒ ii;
Spt. chloroformi, ... ʒ i;
Iufus. quassiæ, ... ℥ viii. M.

Sig: One sixth part twice daily, at eleven and six.

Sometimes neither mixture agrees, and then he prescribes sulphate of iron in pill with meals, and a saline aperient on first awaking in the morning. By this method Clark claims that nine out of ten cases of chlorosis recover in from one to three months, and by careful attention to the bowels, taking twice a week a pill composed of aloes, myrrh, and iron, the recovery will probably be permanent.

There is one important fact concerning the treatment of chlorosis upon which stress has been recently laid by Stephen Mackenzie, and which I have had repeated opportunities of verifying. It is that while it is easy to improve the condition of a chlorotic girl up to a certain point, it requires great perseverance on the part of both physician and patient to effect a complete cure. The hemaglobin percentage may rise from 25 or 30 to 70 or 75, and may there remain for many weeks. The patient's general condition is vastly improved; she considers herself well and refuses to continue the treatment that has apparently cured her. Relapse under such circumstances is certain and speedy. Ferruginous preparations should be continued for two or three months after apparent cure.

DISCUSSION.

DR. LYMAN BEECHER TODD, Lexington: I desire to express my high appreciation of the paper to which we have just listened. It is an able presentation of the subject of chlorosis. To the family physician it is a subject of great importance, whether he resides in the city or in the country, where the students go to these seminaries. Delicate females between the ages of twelve and fifteen are commonly subject to this distressing trouble. I was particularly impressed with one point to which the doctor alluded, and which I have had the pleasure of bringing before this Society, namely, the distressing complaint of constipation in connection with chlorosis. There is nothing more important to engage our thorough and constant attention than that of the digestion and the condition of the patient's bowels. The doctor's remarks were most valuable in that regard. I was particularly pleased with his treatment of chlorosis.

DR. JOHN A. LARRABEE, Louisville: I came in too late to hear the paper, but I heard enough of it to make me regret that I was absent during the reading of any part of it. I was particularly struck with what the essayist has said in regard to the treatment by iron. There is a point in the establishment of chlorosis as well as anemia and different anemic conditions which we ought to take cognizance of as coming from the nervous system; what the changes are, and how they are produced it would be a difficult thing to explain, and that is the change produced upon the red blood-corpuscle by a sudden shock to the nervous system. Cases present themselves where millions of these bodies are blotted out in an instant by the nervous shock. Cases of anemia produced by fright are enigmatical to us, although they are said to occur every now and then in our practice, especially in the sequelæ of chorea and such manifestations as can only rise from starvation of the blood. I can but think in many females mostly concerned with the growing and developmental period that the effect produced upon the blood-corpuscle through the nervous system is there best displayed. The point I want to make is this, that while it is established that iron is the necessary ingredient in the blood and the lacking ingredient in chlororis it is about the same thing that we have in other cases of faulty assimilation, as, for instance, in rickets. We know rickets

is a disease characterized by impaired nutrition and alteration in the growing bones, and if you give ingredients that are lacking in building up you do not cure the disease. There is something more necessary than the lacking pabulum of the blood. The essayist covered that point well when he alluded to the practice of administering mercurials. We are all cognizant of the fact that minute or small doses, frequently repeated, of calomel in the treatment of chlorosis are followed with good results, even without iron. Calomel given in that way, and repeatedly, produces a tonic effect upon the blood. The use of purgatives along with iron must not be forgotten. It is said that Niemeyer has cured more cases of chlorosis with Blaud's pills than with any other medicine. A combination of aloetic medicines with iron has been known to be successful in the treatment of this disease when iron itself would not be. The judicious use of iron is what we want to obtain, but a good deal depends upon the manner of its use. Purgatives should be administered with iron. I am very glad the essayist alluded to the sulpho-protoxide of iron as being the thing *par excellence* of iron preparations. If the preparation is suitably protected, so that it is not capable of higher oxidation outside of the body, the sulpho-protoxide of iron with aloetic purgatives will stand the test in the treatment of this disease.

DR. CURRAN POPE, Louisville: I would like to make a few remarks on a line that is not strictly medicinal. Those of us who are brought into constant daily contact with the weak and neurotic female suffering with various disorders of the hemic function, know that in the use of hydrotherapy we possess an agent which is capable of not only changing the chemical process in the digestive system that predisposes to the hemic condition, but produces under proper application a condition in the system favorable for the development and acquirement of hemoglobin. If we start with nervous, excitable, chlorotic females, and by gradually accustoming the system to the external application of cool water with massage and gradually coming to the dripping rain baths and douches, we will find the medicinal treatment of chlorosis and the hemic condition not only materially hastened, but the ultimate result will be good. The ingestion of large quantities of water is of more value, in my opinion, than a small quantity of iron contained therein. We know that it has a bene-

ficial effect upon the kidneys, eliminating the waste products of the system, increasing the watery secretion of the bowels, and and thus doing away with the necessity of laxatives. We further know with the impact of water upon the external surface of the body there is the development of heat from the contraction of the muscles, and the result is favorable not only to the process of digestion but of elimination by the bowel. I give large quantities of water internally at stated intervals during the day, and give one hydrotherapeutic application during the twenty-four hours. Again, I have myself, as I judge the writer has done, trained my patients to learn that the hemoglobinometer is the only safe instrument by which we can judge the progress in a case of chlorosis or in any anemic case. I have used the saccharated carbonate of iron with slight success, but not as compared with the sulphate. Sulphate in combination with arsenious acid or the arseniate of soda and cannabis indica in small doses, frequently repeated, I have found to be far the best medicinal treatment. Whenever you apply hydrotherapy to the body you have increased elimination, increased appetite, and increased ingestion of food. I believe ingestion of food with moderate doses of iron and the use externally and internally of hydrotherapy is the true solution of the treatment of anemic conditions.

DR. HENRY (closing the discussion): The last speaker told us that he is accustomed to make his diagnosis and follow the progress of the case by means of instruments of precision, such as the hemoglobinometer, and things of that sort. I do not mean to say that a diagnosis of chlorosis can not be made without such instruments just as a diagnosis of pneumonia may be made without auscultation and percussion. I do insist that it is only by such instruments that a diagnosis of chlorosis can be positively made in all cases and the progress of the patient followed until we are sure of a cure.

CRANIOTOMY, SYMPHYSEOTOMY, AND CESAREAN SECTION.

By John G. Cecil, B. S., M. D.
Louisville, Ky.

Manifestly it will be impossible in the time allotted to this paper to enter upon a full discussion of the comprehensive subject given as its title. Much of interest must of necessity be omitted. To describe these operations would in this presence be a bootless task; to consider their respective merits would likewise be useless. Neither will the attempt be made to demonstrate the superiority of one above the other by statistics. That "figures won't lie" may be a mathematical truism, but figures won't tell the whole truth in obstetrics any more than they do in surgery. With these features passed by there still remains several important and interesting phases to profitably engage our attention.

Each one of these operations has a place in obstetric surgery, and we may safely say that they are here to stay. Much of the confusion as to the special indications for either one of them has been dispelled. Out of chaos has come a pretty well-defined order. Obstetrics shares with surgery the good results of clean work. More is due to the prevention of septic infection, so prone to follow these operations, than to improved methods of doing them. The concept of each one dates far back into history. Cesarean section has a mythological birth as old as the Christian era, became a recognized surgical procedure from the first of the sixteenth century, was modernized by Sänger and Porro. Symphyseotomy was first performed by Sigault in 1777. At first welcomed, after a

run of twenty-five years it was abandoned and fell into entire disuse, being condemned by Baudelocque, the obstetric king of his day, and also by the bad results following it. In 1866 it was resurrected and rehabilitated by Morisani, and now no longer requires a champion. Craniotomy is almost as old as the obstetric art itself. So the histories of these operations have been written and rewritten; each one is legitimate, each has its place, the sphere of each is becoming more closely limited and better defined. The one has its complement in the other two, so that taken together they arm the obstetrician with good hope of relief in any case, or, in other words, there is no case of obstructed labor to which one or the other of these procedures is not applicable; and while the safety of the child is enhanced there is little if any danger added to the life of the mother. Improved operative methods, hedged about with aseptic precautions, do not surpass in importance a better understanding of the special indications for each of these operations. And for this last we owe much in honor and praise to the genius of men now living.

A question, the importance of which can not be overestimated, and upon which largely depends the final outcome, is to have a clear apprehension of the situation before any thing is done. The urgency of the case and in our desire to relieve we often go about it in, if not the wrong, certainly not the best way. Skill in diagnosis is hardly second to skill in operation. I am persuaded that in no branch of medicine has this been neglected more. How many brilliant and otherwise successful operations become failures because they follow abortive attempts at delivery with the forceps wherein the strength of the patient has been exhausted, the soft parts bruised and lacerated, and the operative field hopelessly septic. In the Baudelocque clinic, during the year 1893, Pinard performed no embryotomies on living children and had no cases of artificially induced labor, and there were only a few cases where the forceps were applied, yet there never were

more cases of contracted pelvis in the clinic in the same length of time. His cases were thoroughly studied, carefully diagnosed, and operated upon in the proper way at the proper time.

Two years ago, at Frankfort, Dr. T. S. Bullock made some very pertinent remarks upon pelvimetry, which, let us trust, have borne good fruit in the work of the Fellows of this Society. Permit me to still further emphasize his remarks by saying that I believe this is a subject as yet little understood and still less practiced in this part of the world. It is the key to the situation in many cases demanding interference; for upon our estimate of the pelvic diameters depends the selection of the operation best indicated for relief. While it is true no perfectly satisfactory pelvimeter has been invented there are several that are useful. In answer to my question, "What is the best pelvimeter?" Prof. Chrobak, that grand old obstetrician of Vienna, held up a big fat pudgy hand and said, "This is the best pelvimeter." I afterward saw him use it for this purpose and decide for a cesarean section, which I will report later on if time permits. The importance of this part of diagnosis is emphasized in the clinic of Sänger, Zweifel, Leopold, Rosthorn, and in all the great clinics of the Old World. We do not see as much of pelvic deformities in this country as is seen in the cities of Europe; a blessing perhaps not appreciated as highly as it should be, but there is enough of this and other obstructions to natural delivery to stimulate far more attention than has been accorded it. Dr. P. A. Harris, of Paterson, N. J., in a paper read before the New York Academy of Medicine, December, 1894, "directed attention to the small percentage of cases, one or two per thousand, having pelves so much distorted as to render it impossible for an average-sized child to be born alive in the natural way; also to a much larger group, represented by one woman in fifty or one hundred, whose pelvis is sufficiently contracted in some way or other

to embarrass parturition, if indeed it does not endanger the life of both mother and child;" just such cases as frequently constitute a relative indication for cesarean section or a positive indication for symphyseotomy.

At this juncture permit a word in regard to the use, or rather the abuse of the obstetric forceps. Nothing shall be said to detract from their value. That their use has done more than any other obstetric measure to alleviate suffering and add countless years to human life no one will deny. Yet too often they constitute the sole resource, too much is expected of them, they are not the panacea for all obstetric ills. Herein appears the abuse of this invaluable aid: too often have they been applied when their use was positively contraindicated, and some other operation was indicated and demanded. Bad results have followed such misapplication to the discredit of the forceps, while the fault lay in the imperfect diagnosis.

This brings us to a brief consideration of the three operations above named. Craniotomy will always have its advocates, but that it must decrease while the other two increase is already a matter of history. Under aseptic precautions and in the hands of those unfamiliar with the more formidable operations it is probably the safest, that is, less destructive to maternal life, but in the light of modern surgical achievement *it is not indicated upon a living child.* It is indicated upon monstrosities, hydrocephalics, and upon dead children, but not in any case of such extreme narrowing of the pelvic canal as would render the destruction of the child very difficult and delivery of the fragments destructive to the soft parts.

Symphyseotomy is now generally admitted to be a perfectly justifiable operation. The limits are being more strictly defined as its scope is better understood. It will probably displace the cesarean operation in cases where there is only the relative indication. It finds its ideal indication in the

justo-minor æquilibitur pelvis. A proper case for it is one of occipito-posterior position, which, either on account of a large fetal head or a small pelvic canal, can not be delivered by version or by the forceps without such violence as would endanger the maternal structures and put the life of the child in great jeopardy. Multiparæ are better subjects than primiparæ. Pinard suggests that in the latter, before incising the symphysis, it is well to dilate the soft parts by the aid of Champetier's balloon in order to avoid laceration of them. Much may be done to prevent laceration by following Varnier's advice to bring the patient's thighs together when the head is engaged. Morisani does not advise the operation when the conjugata vera is less than two and three fifths inches. He also places the maximum limit of this diameter at three and one half inches. After the division of the symphysis, including the subpubic ligament, unless the situation is urgent, it is well to leave the delivery to nature rather than drag the child through with forceps. The more haste in delivery with the forceps through the undilated parturient canal the greater the danger of lacerations; this is proven by experience to be especially true when the subpubic ligament is undivided. Under strict asepsis, "if the conjugate diameter is greater than three and one quarter inches, it is permissible to attempt extractions with the forceps before symphysis is divided; in the interest of the child, however, do not push its use too far." "The bad results of symphyseotomy may be attributed to the fact of the operation having been performed outside of the limits indicated, and depend upon (1) the time during labor when the operation is undertaken, (2) the method of execution, (3) previous bad treatment of the genital parts, (4) special conditions affecting the patient. Death of the fetus may be attributed to (1) tardy intervention, (2) accidental circumstances, (3) operative measures necesssary for its extraction." The above is the conclusion of Morisani in a paper before the Eleventh International Medical Congress, Rome, April, 1894.

The indications for cesarean section are in the main well defined. In the interests of both mother and child, in all cases of greatly deformed pelvis with conjugate diameter of less than two and three fifths inches, the cesarean operation, either the classical or one of its modifications, is demanded. It is also justifiable when cancerous or other inoperable tumors so obstruct the genital canal as to render the delivery either safe or practicable by any other means. The contention between the adherents of these two operations, symphyseotomy and section, is principally over that group of cases having what is known as the relative indication for section. Those familiar with the cesarean operation will, in this class of cases, continue to uphold and practice it, but with others symphyseotomy will probably displace it.

Further indications for cesarean section are extreme cases of cervical or vaginal atresia and rupture of the womb with escape of the contents into the abdominal cavity. *Considering the frightful fetal mortality and the great risk to the life of the mother, I am about prepared to say that placenta previa centralis constitutes a legitimate indication for the cesarean operation.*

In bringing this paper to a close I can not better sum up what I wish to say in regard to the proper time for and the method of doing this operation than by reporting a case I had the good fortune to witness in the clinic of Prof. Chrobak in Vienna. Being himself indisposed the operation was done under his supervision by his assistant, Dr. Regnier. The case was a primigravida, about thirty years of age, badly deformed from osteomalacia, the conjugata vera measuring near two and one half inches. She was at full term, and labor pains just beginning. No attempt to deliver was made. After thorough preparation the anesthetic was given, and the operation commenced. An incision in the median line nine or ten inches in length opened the cavity. Without further delay a cut of about six inches through the uterine wall, with the uterus still *in situ*. It happened that the cut was directly over and through the placenta. Hemorrhage for a moment

was alarming. He at once tore through the placenta, and, while the hemorrhage continued and the liquor amnii escaped with a gush, he delivered an eight-pound child breech first, which at once cried lustily. A clamp on the cord, and a snip of the scissors separated the child from its mother in less than two minutes from the time he had taken up his knife. One assistant made firm pressure upon the abdominal walls, holding the womb well up into the incision, while a second grasped the womb with both hands about the cervix and thus controlled the excessive hemorrhage until a stout cord could be substituted for his hands. The after-birth and membranes were stripped off and removed, being followed promptly by a firm uterine contraction. It was the intention of the operator to do the classical Sänger operation, and several sutures had been introduced to close the uterine wound when two small fibroids were discovered on the posterior surface of the womb. After a moment's counsel they determined to complete the operation according to the Porro modification. The broad ligaments were tied *en masse* and cut loose, the bladder and rectum were dissected away from the uterus, a free margin of the serous coat being left. A second rubber cord was then placed low down about the cervix and the womb amputated just above the vaginal attachment. The rubber cord was now removed and all bleeding points tied; the cervical cavity was freely cauterized with a Paquelin, and a lamp-wick iodoform drain drawn through into the vagina. The free margins of peritoneum were carefully quilted over the stump, all sutures and ligatures cut short and the stump dropped. The cavity was sponged, dried, and closed by two rows of closely applied silk sutures. Notwithstanding the escape of much blood and amniotic fluid into the abdominal cavity there was no irrigation, nor any drainage except that through the vagina by the lamp-wick. The whole time consumed was one and one quarter hours. Five days later, when I left Vienna, both mother and child were doing well and gave every promise of recovery.

EXTRA-UTERINE PREGNANCY: FOUR RECENT CASES.

By David Barrow, M. D.
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Case 1. Mrs. W., aged thirty-four; married twelve years. Two children, one twelve and the other nine years old. Has not been pregnant since birth of last child. During the past two years has been treated for some pelvic trouble, but the symptoms were never severe. Menstruation always regular but scanty. From December 4th to 7th had a normal period. January 1st there was a slight bloody discharge, lasting only a few hours and attended by pain. From the 1st to the 9th there was occasionally a discharge of blood, with rather severe paroxysmal pain. From the 10th to 20th the flow was free, but at no time could decidua be detected. The pains were very intense in the region of the right tube; would come usually at night and last an hour or two. None of the usual symptoms of pregnancy existed. Extra-uterine pregnancy was suspected, and I asked to have Dr. Kinniard see the patient with me. On the 21st chloroform was administered and a careful examination made. To the right of the uterus, and high up, could be felt a round mass about the size of a walnut; the uterus was apparently not enlarged. Dr. Kinniard agreed with me in the diagnosis, and that evening she was taken to the Protestant Infirmary. Her condition was good, and there was no evidence of rupture. She was well purged on the 22d. From the 21st to the 23d the pulse increased in frequency and was much weaker, but there was no positive evidence of hemorrhage. On the 23d the abdo-

men was opened. Present: Drs. Kinniard, Patterson, Witherspoon, and Todd. There was about a pint of fluid blood in the cavity. The ovum was in the outer third of the right tube, and the hemorrhage was continuing from a small rupture. Right tube and ovary were removed; large irrigation and glass drainage. Pulse remained rapid and feeble for nearly a week, but otherwise convalescence was smooth and uneventful. She returned to her home in about a month. I believe the rupture occurred at the examination on the 21st.

CASE 2. Mrs. C., aged about twenty-eight; married thirteen years. One child, seven years old, and one miscarriage five years ago. No pregnancy since. Menstruation was always regular, but during the periods there was always some pain and great nervousness. Occasionally during the past few years the patient has suffered severe abdominal pain, probably attacks of appendicitis, and ever since the birth of her child there have been symptoms indicative of pelvic disease. In December she passed her period ten days, followed by irregular bleeding for three weeks, with severe paroxysmal pain. At 2 A. M., January 31st, she was awakened by intense pain in the lower part of the abdomen. In a little while there was great weakness, and she fainted. She was soon revived by the use of stimulants and by a hypodermic of morphine.

From the 31st of January to the 4th of February she suffered a great deal, was greatly prostrated and in a critical condition. That day she grew rapidly worse, and at 4 P. M. I saw her for the first time. Her condition was extreme, and death seemed imminent. The skin was cold and clammy, the temperature subnormal, the thirst great, abdomen distended and painful, restless, and the pulse almost imperceptible. It was evident that she was bleeding to death.

Ruptured tubal pregnancy was diagnosed and operation advised. At 10 P. M. the operation was done. Present: Drs. Kinniard, Patterson, Witherspoon, and Bullock. Ether was

given, but on account of her extreme condition anesthesia could be only partially maintained, and at no time was she wholly insensible to pain. On opening the abdomen blood gushed out in great quantity. The left tube had ruptured and was bleeding; it and the ovary were removed. The right seemed healthy. Several gallons of water were used in the irrigation and a glass tube inserted. She was put to bed in a better condition than expected, no worse for the operation. She reacted slowly and did well for ten days. At that time she complained of excruciating pain in and above the right iliac fossa; the temperature went to 102°, and the pulse to 120. Soon induration appeared and extended gradually to the median line. The fever and pain continued, and on the twentieth day after the operation an abscess discharged through the bowel at least a pint of bloody pus. This continued for about a week. She improved slowly, but at this time is getting about and seems well. The abscess should have been evacuated by operation and the chance of favorable rupture not taken.

CASE 3. Mrs. P., aged thirty; married eleven years. She has two living children and one dead. They were born nine, seven, and four years ago. She has had no miscarriage. Menstruation has always been regular and almost painless. For two years has had a few symptoms referable to the pelvic organs. At last regular period, February 15th to 18th, suffered a great deal of pain. No menstruation in March, but on the 25th there commenced a bloody discharge, at times profuse, which continued until the operation was done. The pain was intense, lasting for two or three hours, and recurring every day or two. I first saw the patient on April 10th, with Dr. Skillman. To the right of and behind the uterus was a mass filling a large part of the pelvic cavity, being tense and fluctuating; the uterus was but little if at all enlarged; was fixed and pushed forward. A diagnosis of extra-uterine pregnancy was made. The

patient went to the Protestant Infirmary on the 12th, and on the 13th the operation was done. Present: Drs. Skillman, Patterson, Witherspoon, Todd, and Coleman. Adhesions had confined the blood to the pelvis. The ovum was in the outer portion of the right tube, and leakage had taken place through the fimbriated extremity. The right tube and ovary were removed; the left, being diseased and adherent, were also removed. Irrigation and drainage. The patient reacted quickly and recovered rapidly. She returned home three weeks after the operation, well.

CASE 4. Mrs. M., aged twenty-eight; married nearly five years. No children, but had a miscarriage five months after marriage, and one since; she thinks she aborted at the second month. Ever since the miscarriage has had some pelvic trouble, and was treated by Dr. Poyntz, of Richmond, for several months. Menstruation painful and slightly irregular. From February 1st to 3d, inclusive, she menstruated, in every respect naturally. Soon after she complained of slight pelvic pain and irritability of the bladder, and of some nausea and vomiting. She supposed that she was pregnant, and continued to attend to her household duties. Until April last she did fairly well, although suffering most of the time. From April 1st to 17th she was in bed a great deal, and at times suffered severe paroxysmal pains. On the 17th I saw her for the first time. She was then complaining of intense pelvic pain, had a weak and rapid pulse, was sweating profusely, and quite nervous. The mammæ were enlarged and contained "milk." An examination *per vaginam* revealed nothing positive, but was very unsatisfactory on account of the surroundings and resistance to manipulation on the patient's part. She lived in the country, and I did not see her again for ten days, but the husband reported her better. On the 27th he came for me, stating that his wife was much worse, and suffering as she had when I first saw her. I insisted that she be brought to the Protestant Infirmary, as it would

be necessary to give an anesthetic for diagnosis, and it was impossible for me to attend her at home. Told him that I suspected extra-uterine pregnancy. On the 30th she was taken to the infirmary, and on May 1st, under chloroform, I made a careful examination. The uterus was enlarged, and to the left and behind was a mass as large as an orange. At every visit there had been some elevation of temperature, ranging from 99° to 101°, and at no time had there been bleeding from the vagina. The trouble was either pelvic abscess or tubal pregnancy, and I was rather inclined to the former opinion. Operation was done on the 4th. Present: Drs. Poyntz, Skillman, Witherspoon, Patterson, and Kelley. There was free blood in the cavity, and in the pelvis every thing was matted together. On separating adhesions and delivering the tube and placenta hemorrhage was great, and the pulse became weak and rapid. The placenta was still attached to the tube, and also to the intestine; the fetus was felt deep in the pelvis, and was delivered. It was three and a half inches long, a male, and at least three months in its development. The right tube and ovary were diseased and adherent, and were removed. The uterus felt like a cyst, and was as large as the fist. Intra-uterine pregnancy was thought probable. The omentum was considerably torn in freeing it from adhesions, and a part of it was ligated and cut off. Several gallons of water were used in the irrigation and a glass tube inserted. The patient was very much shocked; was put to bed sweating profusely, with a weak and rapid pulse. She reacted slowly, but the pulse remained about 150 for two days. Six hours after the operation active uterine pains set in, with free bleeding from the vagina. Gave by enema an ounce of fluid extract black haw and a hypodermic of morphine. This quieted her for twenty-four hours, but the pains and bleeding returned; gave another hypodermic. No return of the pains, but for several days there was slight bleeding. From this time convalescence

was uneventful, and the patient is now well. I believe there is intra-uterine pregnancy.

Remarks: The cases here reported have come to me during the past five months. In all, save one, the diagnosis was comparatively easy, and in every instance the patient consented readily to the treatment proposed. To the prompt resort to surgery I attribute largely the successful results obtained. In discussing the subject of extra-uterine pregnancy I do so mainly as my cases bear upon the subject. To attempt to discuss the subject fully is out of the question, and I hope my remarks will be practical and to the point. The cause of extra-uterine pregnancy is almost invariably tubal disease. The lining membrane is congested and swollen and its epithelium destroyed, so the impregnated ovule finds a favorable surface for its implantation. As a rule the evidence of tubal disease is slight, not often requiring the patient to seek the advice of a physician. Careful inquiry will, however, elicit the fact that there has been more or less pelvic pain, or some symptom indicative of tubal disease previous to the impregnation. If the usually accepted physiology of the tube and its epithelium and of fecundation be true, it can be readily seen how the tubal disease may be responsible for extra-uterine pregnancy. In many cases no cause can be traced, the woman has been free from pelvic symptoms, and the first evidence of the trouble is tubul rupture. Dependent upon the tubal disease, or upon a frequent coexisting endometritis, there is often sterility, this being true of the cases reported in this paper. Extra-uterine pregnancy is certainly more frequent than is usually believed by the profession. Most physicians in active practice have met with these cases, and often have failed to recognize them, the cause of death being attributed to idiopathic peritonitis or some other condition. Formad, in 3,500 general autopsies, found the cause of death in thirty-five due to tubal pregnancies. Hematocele and pelvic hematoma are almost invariably ruptured pregnancies. So are some

pelvic abscesses due to this cause. As many as a dozen varieties of extra-uterine pregnancy have been mentioned, but practically the tubal is the only one to be considered. With the possible exception of the ovarian, all extra-uterine pregnancies are tubal in the beginning, and only after tubal abortion or rupture do we find some one of the varieties mentioned. The ovum may implant itself in any part of the tube, if in that part passing through uterine tissue we have the interstitial variety of tubal pregnancy. Upon the early recognition of this condition depends its successful treatment. Without surgery the mortality is great, probably 80 per cent; with timely interference nearly all recover. With disaster on the one hand and brilliant results on the other, every practitioner of medicine should be on the alert and use every known method to make a diagnosis, and make it early. The result of no abdominal operation is more gratifying to the patient or to the surgeon than a timely operation for extra-uterine pregnancy. Before rupture the operation is one of the easiest; if delayed, it may be one of the most difficult. If systematic in obtaining the history and thorough in our examination (an anesthetic should be given if in doubt), the diagnosis in many cases can be made before rupture. Of course, in the cataclysmic cases the diagnosis is made from the symptoms caused by the hemorrhage. A patient suspecting normal pregnancy, and giving unusual symptoms of any kind referable to the uterus or pelvis, should be carefully questioned and examined with a view of extra-uterine pregnancy. If, with the symptoms of pregnancy, or without such symptoms for that, there be delay in menstruation of one or several weeks, followed by irregular bloody discharge, with or without decidua, and intense, spasmodic pain, lasting an hour or so and recurring every day or two; and if on examination we find a mass to one side or behind the uterus, and but little or no enlargement of that organ, we can feel reasonably sure of extra-uterine pregnancy. If, in addi-

tion, there is sterility of several years' duration, and a history of chronic pelvic disease, we can feel doubly sure of the diagnosis made. It is true that in exceptional cases there are but few or no symptoms, and when called, rupture having occurred, we find the condition extreme from the shock of peritoneal invasion and loss of blood. I believe and contend that more of these cases should be recognized before rupture, and if they were not put aside carelessly with the general opinion that they were cases of "threatened abortion," more accurate diagnoses would be made. The symptoms of tubo-ovarian disease will sometimes closely simulate extra-uterine pregnancy; in fact, so much alike may the two be that a positive opinion can not be formed. But this is the exception, and careful study and observation will enable us to distinguish one from the other. Because we do meet with cases that are impossible to diagnose, there is no excuse for failing to recognize those with a reasonable number of diagnostic symptoms. Probably the first to attract attention is the cessation of menstruation; this alone does not indicate much. Then comes the irregular bleeding, and the characteristic, intense, spasmodic pain. A physician should never let a patient go along with irregular or continuous menstruation (or bleeding) without ascertaining the cause, if it be possible. Examine her once (if necessary, repeatedly,) under an anesthetic, and never cease the investigation until the cause is found. The pain caused by extra-uterine pregnancy is characteristic. It does not come often, at short intervals, as do the pains of abortion, nor is it the same kind of pain. Usually it is much more intense, referred to one side of the pelvis, lasts often for an hour or two, and comes only once or twice during the twenty-four hours; it may be not so often. The patient will become pale and the face indicate great suffering, and she will beg for morphine or something to relieve her. In all of my cases the description of the pain was suggestive of the trouble existing. We must not forget

that the decidua is sometimes thrown off in mass, and on careless examination a diagnosis of abortion is apt to be made. In some cases symptoms of pregnancy exist—nausea, indigestion, tender mammæ, etc. This was true in only one of my cases. On digital examination we find a mass in Douglas' pouch or to one side of the uterus. Without an anesthetic it is often impossible to make it out at all, as the patient contracts her muscles and resists on account of the pain attending bimanual manipulation. If the examination is made before there is much peritonitis, the mass (impregnated tube) is well defined, usually round, and not like the long sausage-like mass that we often see in pus tubes. If there has been slight bleeding from a rupture or through the fimbriated extremity of the tube, we have a more or less active peritonitis. In this event the mass (impregnated tube, adherent intestine, and exuded blood,) may fill a large part of the pelvic cavity, and sometimes can be felt above the pelvic brim. With the finger in the vagina it will be noted that the mass is elastic, tense, and fluctuating, and, if several examinations be made, rapid increase in size may be noticed. Should the hemorrhage be so great that adhesions can not form, it will be difficult to make the diagnosis of free blood in the peritoneal cavity by bimanual manipulation. A hemorrhage so active, however, will give decided evidence of its existence, and the physician must realize as soon as he sees such a case that unless he acts promptly death will soon close the scene. Should the hemorrhage be sub-peritoneal, from rupture into the folds of the broad ligament, the bleeding is limited. Such a case, I believe, I saw a few years ago recover without operation. In only one case have I been assisted in my diagnosis by the passage of decidua, and that was in one operated upon several years ago. The decidua was not detected in any of the cases reported in this paper. Should the patient not die from loss of blood at the time of rupture, she still has much danger ahead. The adhesions

may give way and death result from a second or subsequent hemorrhage, or the mass may become infected, suppuration follow, and the patient subjected to all the perils of a pelvic abscess. Even should she escape these, and the placenta and fetus continue to develop, any procedure then instituted is attended with much greater danger than if done previous to or soon after rupture. After there has been bleeding in the pelvic cavity there is more or less constant pain or discomfort, the bladder is often irritable, and the bowels hard to move. Should there be intra- as well as extra-uterine pregnancy, the case is complicated and the diagnosis more difficult to make. This was the condition in my fourth case, and caused me to waver between extra-uterine pregnancy and pyosalpinx.

The treatment of extra-uterine pregnancy is surgical. Electricity, injections in the sac, etc., are advocated by some, and cases are cured by these means, but to me a prompt resort to surgery is the only treatment worthy of consideration, when the patient's consent can be gotten and the physician is prepared to do such surgery. These patients do well after operation, if done early, and convalescence is usually rapid. Open the abdomen, separate the adhesions, deliver and tie off the impregnated tube and its ovary as quickly as possible. If there has been no leakage or rupture the operation is exceedingly simple, and may require neither irrigation nor drainage. After rupture the condition is more complicated, dependent upon the quantity of blood in the peritoneal cavity, the adhesions existing, and the strength of the patient. In the second case so weak and exsanguinated was the patient that she could not be completetely anesthetized, and at no time was she insensible to pain. From the discoloration of the peritoneum rupture can usually be determined, if in doubt, before the cavity is opened; completing the incision, the fluid and clotted blood gushes out in surprising quantity. In all of my cases irrigation was large and

thorough; but no matter how long continued some blood and an occasional small clot would be washed out by the irrigating fluid. All of the cases were drained. When the loss of blood has been excessive the pulse will remain rapid and weak for several days, causing much anxiety to the surgeon. Three of the patients had weak and rapid pulses for some time, although doing well in other respects. My fourth case had a pulse of 150 during the second day, although she was bright and apparently doing well; in all the pulse remained over 100 for the first five days following the operation.

When possible these patients should go to a hospital; there the surroundings are favorable, and the services of a trained nurse are almost indispensable. In an emergency I of course operate anywhere and do the best I can. Three of the patients went to the Protestant Infirmary, and the other was operated upon at her home. I attribute the successful results largely to the faithful attendance and care of the nurses in charge.

ANTE- AND POST-PARTUM HEMORRHAGE.

By A. D. Price, M. D.
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The time has come when the accoucheur should, in his own behalf and the interest of the pregnant woman, demand that she be under his constant supervision from the earliest months of pregnancy to the completion of the lying-in. He can in no other way obtain the knowledge that will enable him often to avoid the many dangers that surround her, and to safely conduct her through the trials of labor, and to insure speedy restoration to health. The recognition of the patient's condition, the knowledge of difficulties that may be encountered, the ability to frequently avert danger and save life, and the importance of being always prepared for any and every emergency teach us that this should be an imperative rule.

In opening the discussion on ante- and post-partum hemorrhage I offer no apology for the following observations based upon my own experience and culled from the literature of the subject.

In placenta previa the placenta is inserted into the lower uterine segment; it never extends into the cervical canal, and the extent to which it overlaps the internal os measures its importance.

The varieties of previa are centralis, partialis, lateralis or marginalis—terms self-explanatory. Closely allied to this abnormal situation of the placenta is that condition in which it is inserted into the so-called danger zone, the lower uterine segment contiguous to that which undergoes dilatation, and which is often the cause of serious and dangerous hemorrhages.

A case of this kind recently came under my observation during the temporary absence of her medical attendant. She was a primipara, had had a number of hemorrhages at intervals of a few weeks that ceased spontaneously on the patient being put to bed, but which finally led to premature labor and the expulsion of a dead fetus.

In previa the placenta is often abnormally adherent, and the cord is frequently prolapsed, due to its marginal insertion, and when this latter condition exists the dangers to the viable fetus are increased.

Fortunately this disease is of rare occurrence. While its cause is unknown, it has been noted to be "more frequent in multiparæ and in those who have borne children with great rapidity, and in pregnancies shortly following abortion, conditions favoring relaxation of the uterine walls, dilatation of the uterine cavity, and defective development of the decidua." It is claimed that straining, overexertion, concussion from a misstep or fall are no mean factors in forcing the ovum to the lower uterine segment, where it may become arrested, and the development of placenta previa will be the result.

Only about one third of all cases reach the end of gestation, abortions and premature labor being frequent and due to accidental hemorrhage. Abnormal positions, as breech and transverse, are favored by the relaxed condition of the uterine walls and are not uncommon.

The pseudo-menstruation of pregnancy is generally indicative of placenta previa. The danger signal is the first hemorrhage, which may occur at any period. When it takes place without assignable cause after the fourth month of utero-gestation placenta previa can be safely diagnosticated. The most frequent period of the hemorrhage is within "the six weeks preceding term;" it may, however, be delayed until the beginning of labor, especially if the placenta is situated laterally.

The hemorrhage generally occurs suddenly, without pain

or warning of any kind. The amount is due to the extent of the placental separation; and, while it is apt to be slight at first, it is liable to become so profuse at any moment as to endanger the life of both mother and child, especially on the recurrence of the hemorrhage.

When the loss of blood is excessive the symptoms of profound anemia supervene: "Restlessness, headache, vertigo, short, interrupted, sighing respiration, small, weak, thready pulse, cold, clammy perspiration, convulsions, and death." *Post-partum* hemorrhage and sepsis are liable to follow placenta previa, and their prevention demands the absolute cleanliness of attendants, patient, and surroundings, and the watchful and unremitting care of the physician until all danger has passed.

The prognosis is always grave, the danger being in proportion to the extent and situation of the placenta. The central insertion carries with it the greatest peril to both mother and child, and the marginal the least. "The earlier the hemorrhage, the more profuse the flow, and the shorter the intervals between the attacks," the more serious the import.

Statistics teach us the great importance of the subject and impress upon those who do obstetrical work the necessity of formulating definite methods of procedure and having determination to carry them out promptly, boldly, and without bedside interference.

In any given case the question very naturally arises, can it be tided to term and both mother and child be saved? If the insertion is marginal it may be accomplished, but it is a dangerous practice and should never be attempted except in well-regulated hospitals where trained nurses and competent physicians are always at the bedside. The uncertainty, even after a thorough digital exploration, of the extent and situation of the placental insertion, and the progressive dangers to the mother and the imperiled vitality of the child after the

first hemorrhage render such expectancy hazardous in the extreme, and call for its condemnation.

As soon as the diagnosis is made labor should be induced, and this should be done in the interest of the mother, her life being the first and only consideration. No time should be wasted and dangers invited by the use of the tampon. Proceed at once, under strict asepsis, to rapidly dilate the cervix and separate the placenta by sweeping the finger around the lower uterine segment as far as it will reach, or tear through its tissue if centrally implanted, or push it aside at the weakest point if laterally inserted, and deliver with forceps or by turning—the election being determined by each individual case. If the head presents favorably and the dilatation is sufficient, the forceps are indicated; if there is much rigidity it is safer to turn, bringing down a leg till the hemorrhage is arrested by the pressure and leaving the rest to nature.

Barnes' dilators are dangerous; they are liable to be septic, to slip, burst, and disappoint in many ways, and their use is not recommended. Manual dilatation promptly and boldly employed, aided if necessary by the steel dilator, rarely fails. In these cases the cervix is generally dilatable, but occasionally it is rendered unyielding by its length, narrowness, and rigidity. When such a condition exists boldly divide the cervix bilaterally with scissors, complete the dilatation with the fingers, and deliver, suturing the incision after the delivery is completed.

In cases of collapse delivery should be slowly accomplished, and where an anesthetic is required ether should be preferred to chloroform.

One of the most dangerous accidents which the obstetrician is liable to encounter is *concealed hemorrhage.* Its sudden oncoming and rapid progress, its unheralded approach, its liability not to be recognized unless the attendant is ever on the alert and always looking for the unexpected to happen,

with its great mortality (that of the mother being fifty per cent, and of the child ninety or more), invest the subject with special and peculiar interest.

This form of hemorrhage is due to the separation of the normally situated placenta from its uterine attachment, the extent of the detachment measuring its amount and indicating its relative seriousness.

Goodell gives the following conditions in which the concealed hemorrhage may take place: "When the placenta is centrally detached and the blood accumulates in the cul-de-sac formed by the firm adhesion of its margins to the uterine wall; when the placenta is so detached that the blood escapes into the uterine cavity behind the membranes near the fundus; when the membranes are ruptured near the detached placenta and the effused blood mingles with the liquor amnii; when the presenting part of the fetus so accurately plugs up the natural outlet that no existing hemorrhage can escape externally."

Feeble, anemic, and albuminuric women are liable to this accident, and those who have borne a number of children are especially so during the latter months of pregnancy. Its causes, as enumerated, are irregular or partial uterine contractions, external violence, undue exertions, and emotional excitement.

The first symptom is generally collapse from hemorrhage. This condition is marked by the usual indications of shock, and rendered quite certain by weak, intermittent, uterine contractions, by a lateral bulging of the uterine wall from the effused blood, and by great pain from overdistension.

The prompt and speedy emptying of the uterus is demanded on its first recognition. The mother's life (that of the child is not considered) hangs by a thread, and her only safety lies in rapid manual dilatation and quick delivery with the forceps or by turning, which should be preceded by a hypodermic injection of ergot and aided by external

compression. Prompt delivery, never expectancy, should be the rule.

I have endeavored to portray the importance of the hemorrhages that antedate the completion of labor; and there remains to be considered those of no less import that follow.

There is no other class of patients in which emergencies occur so suddenly and which demand such prompt measures of relief as those that come under the obstetrician's care. We should have fixed principles of conduct for every accident liable to be encountered and, banishing every doubt, all hesitation, boldly employ them for the saving of life.

Post-partum hemorrhage follows the birth of the child, and the loss of blood is from the placental site, or from torn or lacerated vessels of vagina or cervix, or from a ruptured uterus.

There is a form of hemorrhage, the *secondary*, that demands brief notice. It may occur any time during the puerperium, and is due to simple relaxation of the uterus, emotional causes, retained coagula, or the presence of a polypus. It is combated by emptying the uterus and securing and maintaining its firm contraction.

When the hemorrhage is due to laceration the uterus is well contracted and the flow of blood is not profuse unless the circular artery be torn. The diagnosis is made certain by ocular inspection. The ligation of the torn vessels is required at once; the proper position of the patient being on her back, the perineum retracted, and the uterus well drawn down with a strong tenaculum.

In true *post-partum* hemorrhage the uterus is relaxed and often undefinable; the flow may be slight or excessive to an alarming degree; it is sometimes concealed, and again its only manifestation is a constant oozing. In this last condition chronic endometritis is liable to exist. A depraved condition of the blood, deficient muscular development of the uterus, and lowered muscular irritability favor diminished

contraction and retraction, and consequently hemorrhage. Prolonged and exhausting labor, too rapid evacuation of the uterus, its overdistension, endometritis, nervous shock, excitement even after labor, anesthesia carried to excess, peritoneal adhesions, tumors in the walls of uterus or adnexa, retained portions of placenta, membranes or clots, dilated and degenerated atheromatous blood-vessels of the uterus, or any thing that "disturbs the mechanism by which the hemorrhage is normally prevented," are enumerated as among the causes of this accident.

It should never be forgotten that hydatidiform mole and placenta previa predispose to *post-partum* hemorrhage, and being forewarned is being forearmed. "Haste makes waste" in many things, particularly in labor, which should never be rapidly completed unless there is some special cause demanding it. Give the uterus, after the head is born, ample time to retract, is a safe rule by which to be guided.

A proper knowledge of the mechanism by which hemorrhage is arrested is essential to the correct management of the the third and most important stage of labor. The spontaneous retraction of the arterial twigs; the plugging of the mouths of the sinuses with fibrinous clots favored by the increased amount of fibrin in the blood of the pregnant woman; the flattening, bending, and closing the venous sinuses by muscular contraction; the lowering of arterial tension, the quieting of the nervous system, and the tonic retraction of the uterus are the methods, we are taught, by which hemorrhage from the placental site is normally prevented.

The third stage of labor requires the most careful management. Hasty delivery of the placenta, as a rule, means great danger; "too early effort in this direction exhausts the uterine muscles and favors relaxation." Give the uterus thirty minutes or more in which to separate the placenta and protect its site by a thin and firm clot; keep the hand over the

uterus that its condition may be known and its contraction maintained, when necessary, by quick, gentle friction, and express the placenta at the proper time by Crede's method, are rules by which the attendant should be guided in every case of labor.

Those who have witnessed a case of severe *post-partum* hemorrhage can appreciate its prevention. Prophylaxis can accomplish much and render these cases exceedingly rare. The patient should be carefully prepared for her confinement by herself and surroundings being made aseptic and by having her rectum and bladder thoroughly emptied, something too often overlooked. The physician should be prepared to battle for life at the first danger signal by having at hand a fountain and hypodermic syringe, ergot, hot water, some antiseptic, ice, tincture of iodine, spirits of turpentine, acetic acid, solution of subsulphate of iron, iodoform gauze, a faradic battery, and a bed-pan.

In habitual bleeders and in those weakened and exhausted and poorly fitted for the trials of labor, strychnine will stay the flagging powers and often tide them over threatened danger. Prolonged labor exhausts the uterine muscles and favors hemorrhage through relaxation, hence the proper use of the forceps is a prophylactic measure of great importance. Chloroform should never be withheld from the parturient woman unless there is some special reason for doing so. It subdues pain, relieves mental distress, quiets the nervous system, and when properly administered "favors better action of the uterus and more efficient contractions after labor."

When hemorrhage occurs empty the uterus promptly, induce contraction and maintain retraction. Carry the hand within the uterus and remove placenta, membrane, and clots, kneading gently while the fundus is compressed externally with the other hand.

The bimanual method is very effective in controlling the hemorrhage. Anteflex the uterus, make pressure on the pos-

terior surface with one hand, and with the other closed in the vagina exert counter-pressure, and thus force the walls together, staying the flow till coagulation takes place.

The next step, should the hemorrhage continue, is quick, gentle friction with ice over the abdomen, followed, if necessary, by its introduction within the cervix or into the uterine cavity. The use of ice within the uterus should be cautiously employed, as it is apt to increase the shock, lower the temperature, favor the development of endometritis, and increase the liability to sepsis.

Compression of the aorta has only a temporary effect, simply giving time for the employment of more efficient measures. And of these the following are noted and the order in which they should probably be used: Intra-uterine applications of hot sterilized water with or without antiseptics (bichloride, boric acid, or creolin), of tincture of iodine or acetic acid 1–4, or, better still, of gauze saturated with spirits of turpentine; this latter is promptly effective and free of danger. The injection of Monsel's solution, 1–12, is effective, but always dangerous, and should never be used except as a last resort. In one desperate case that resisted the measures as detailed, and death was imminent, it promptly checked the hemorrhage and had no unpleasant effects. In another, in which I had occasion to use it, the flow was quickly stopped, but the death of the patient, a consumptive, was hastened by its bad results.

Iodoform gauze as an intra-uterine tampon is efficient and safe, and should perhaps have precedence to intra-uterine injections; it should be removed within twenty-four hours and followed by a vaginal douche.

The faradic battery, one pole being applied to the lumbar region and the other over the uterus or within its cavity, rarely fails to produce prompt and efficient contractions, and should always have a place in the obstetrician's armamentarium.

Ergot does not deserve the good effects usually ascribed to it in these cases. It should never be administered by the stomach, as its action is nil from lack or slowness of absorption, but given when indicated hypodermatically, remembering that an abscess is liable to follow.

The patient's general condition will require attention. If the loss of blood has been great and the shock is severe lower the head, elevate the limbs, apply heat to back of neck and head, and give rectal injections of whisky and hot coffee. If the depression is very great, hypodermics of whisky, ether or strychnine will be demanded. The inhalation of oxygen and the hypodermatic use of morphine and atropia will be called for in those cases where there is "great restlessness and cerebral depression."

The injections of the common salt solution into the rectum or intra-muscular are useful in all cases where the loss of blood has been great and the depression severe.

The after-treatment consists of rest, quiet, stimulants, and nourishing food.

Go to the bedside with well defined methods of treatment and with the necessary preparation to carry them out promptly and efficiently, and you will learn to say that a case of *post-partum* hemorrhage should never be unsuccessfully managed.

DISCUSSION.

DR. J. M. HARWOOD, Shelbyville: The papers to which we have listened are most excellent, and in what little I have to say in the way of discussion I shall indorse what has been said. I must say that Dr. Price's paper is one of the best I have ever heard read in the Kentucky State Medical Society. He has almost fully stated my views on that subject. There is one point in connection with placenta previa in which he failed to express my views exactly, and that is, where the placenta covers almost the entire mouth of the womb. I would suggest in those cases that the child may be delivered by thrusting the hand

immediately through the placenta, not breaking up the adhesions. I do not know of any thing that requires more judgment and care than in deciding when it is necessary to interfere with labor. For instance we have hemorrhage coming on at the beginning of labor, and we are uncertain as to whether we shall interfere or let nature take its course. If the placenta covers enough of the mouth of the womb, of course the adhesions must be broken up, and delivery effected; but if the placenta only borders on the mouth of the womb we can sometimes deliver without any great amount of hemorrhage. To make the diagnosis and to decide when to operate is a very important matter. I have had cases of that kind in which I have permitted nature to take its course and deliver. Again, in other cases I have found it necessary to break up the adhesions, dilate the mouth of the womb, turn and deliver the child.

I have no criticism to make on what the doctor said with reference to *post-partum* hemorrhage.

With regard to Dr. Cecil's paper, in which he dwells upon the operation of cesarean section, I will say I have had no experience with it, and I think such cases as he reports must necessarily be operated on in hospitals where we have every facility for doing such work. I think it will be a long time before cesarean section will be a common practice among country physicians.

DR. R. C. MCCHORD, Lebanon: There is one thing I would like to emphasize, and that is prompt action in all cases of *ante-partum* hemorrhage and the necessity of not depending upon any thing but the hand in doing what you have to do. It is essentially prompt in every respect.

As to the *post-partum* hemorrhage, I think if there is any time when we should be in a hurry it is when we have this condition to deal with. I am opposed to introducing any kind of drugs into the uterus, if we can possibly do without them, and I think the most efficient thing in *post-partum* hemorrhage is hot water. There is nothing that I know of that acts more promptly, that is so efficacious and gives us better results.

As to the use of ergot in all cases, I never use it in any case of labor until after the uterine cavity is thoroughly evacuated. I think it is dangerous. Another thing Dr. Price speaks of that

I am always a little cautious about, is plugging the vagina with gauze after the uterus has been emptied. I think this practice is dangerous, especially in *post-partum* hemorrhage. There is danger of having concealed hemorrhage, and not knowing exactly what you have got. There are some cases in which it is admissible, but I think they are rare. The careful and judicious use of hot water is all that is necessary.

DR. J. G. CARPENTER, Stanford: As to cesarean section in the country, when it is necessary to operate, it is the duty of the obstetrician to be prepared. It is his duty to know before the woman begins labor whether it is necessary to resort to cesarean section; it is his duty to know whether she needs symphyseotomy. There are special indications, and every case of labor should be one of election. We should know the condition of the patient from the time pregnancy begins and have her under our charge until she gives birth to the child. That is ideal midwifery. We can have these conditions in the country the same as in the city. I believe the obstetrician who lets a woman die in this day and time is derelict of duty. We should save them all. The mortality of symphyseotomy is practically nil. Of cesarean section it is small. These are operations of election, and if we know the diameters of the pelvis, the presence or absence of tumors, of cancer of the cervix, transverse presentations, we know just what we are doing.

DR. H. BROWN, Hustonville: I do not rise with the intention of really discussing the subjects that have been so ably and completely presented in these papers, for I do not know where to take hold of them. I agree with Dr. Carpenter in this particular, that it is very desirable that we should see our patients early and thoroughly understand their condition previous to delivery. But my experience has been that we seldom have an opportunity to visit them before labor, especially in country practice; therefore we lose that observation which is so very essential in enabling us to make a diagnosis of the trouble early. In my practice, from time to time, I suppose I have delivered more than two thousand women without an accident.

I understood Dr. Price to say that it is his practice to give chloroform in his obstetrical work. Speaking for myself, I think it is preferable, and I have been in the habit of using it regularly and continuously and have never had an accident.

So far as symphyseotomy is concerned, I have never had a case in which this operation was called for; neither have I ever been called to deliver a woman where there was such marked deformity of the pelvis as to necessitate this operation, and I have been practicing medicine for many years, not quite as long as my friend, Dr. Lyman Beecher Todd. I have never met a case but what I could deliver with safety to the mother and usually to the child, if the child was alive when born. Therefore I am unable to give any statistics.

With reference to Dr. Barrow's paper, I was extremely interested in it. Reports of cases, such as he has given us, make the best kind of literature, and I have nothing to say other than words of commendation for it, as well as the other papers.

DR. WILLIAM BAILEY, Louisville: I must compliment my friend, Dr. Brown, on his record of two thousand deliveries without loss of life. On Wednesday afternoon I was almost sure that there would be nothing to exceed the papers that were then read and the discussions on them and I was about to go home, but let me say I am glad that I remained to hear the delivery of these three papers on subjects of paramount importance and treated only as such men can treat them.

With reference to the paper of Dr. Price, the only one I feel privileged to speak of, the others being strictly surgical, I would ask your attention to one thing in connection with hemorrhage, namely, that the contracting uterus is not a bleeding one, and I believe oftentimes in the hemorrhages preceding delivery, if we separate the margin of the placenta, rupture the membranes, induce contraction, nature will take care of the uterus by internal tampon, so to speak, bringing the child in contact with the bleeding surface, and the contracting uterus is a safe one.

DR. T. B. GREENLEY, Meadow Lawn: I may say that I stand exactly where my friend, Dr. Bailey, does in regard to the character of these papers, in that I am only familiar with the subject which has been dwelt upon by Dr. Price. As to placenta previa I have had several cases, and unfortunately when I have arrived at the place the child was dead, but I immediately delivered the child and saved the mother's life.

In regard to *post-partum* hemorrhage, there can be nothing more admirable in the treatment than the means which have been described by Dr. Price. I have used about all the measures

that he speaks of, but I have had the misfortune to lose two cases in my long practice. In one case the woman got up on the second or third day, went out in the yard, hemorrhage came on suddenly, and she had to be carried back into the house. I was sent for immediately, but my efforts to save her were of no avail. The other case was that of a primipara whose child was born asphyxiated, and while I was resuscitating the child the hemorrhage came on. My attention was closely occupied in trying to revive the child; the woman was bleeding profusely, and when the child came to I handed it to the nurse and turned my attention to the mother. The blood was running from the bed on to the floor, and I immediately introduced my hand into the womb and held it there, one outside, as Dr. Price directed, and the other pressing on the inside, contractions came on, and as I dragged out the placenta the womb contracted. She sat up the next morning, fainted, and fell back dead. Had it not been for her imprudence in wanting to sit up I believe she would have lived. These are the only fatal cases of *post-partum* hemorrhage I have had in my long practice, and I think I have been lucky.

DR. F. J. YAGER, Campbellsburg: I am glad to see the older members of the Society taking part in the discussion of these interesting papers upon gynecological and obstetrical subjects. I have had occasion to call physicians in consultation in two or three cases of placenta previa, and all of you know (who have a large obstetric practice) that if you have ever had one of these cases you do not want another if you can help it. They are the physician's masterpieces. We need in these cases the assistance of those gentlemen who have read these papers—men of experience, of science, knowledge, whose work is scientific. If I have a case of this kind again, I would not hesitate to send for them. We appreciate their services very highly under such circumstances.

Dr. Harwood spoke of introducing the hand into the uterus. The best work I have ever done has been with my hand. It has been the best forceps, the best manipulator, the best investigator, the best and most successful worker of any thing I have ever used in my obstetrical practice.

DR. B. F. HERNDON, Barbourville: Speaking of placenta previa, in a practice of ten years I have only had one case, and that was a breech presentation with dorsal misplacement of both arms.

DR. LOUIS FRANK, Louisville: I desire to add my word of commendation to the excellent papers that have been read. I think these subjects are full of interest to the general practitioner and the surgeon alike. It is this class of cases, especially *ante-partum* and *post-partum* hemorrhage, that call for quick action. We can not delay.

Dr. Barrow is to be congratulated upon the very excellent results he has obtained. He has had an experience that enables him to speak with authority upon these subjects, and the results themselves speak for the perfect technique that the doctor has observed in his operation upon cases of extra-uterine pregnancy, and it is just on this account that many of these cases are better operated upon in well-equipped hospitals and infirmaries. As the doctor has said, if we can not get them into an infirmary or a well-equipped hospital, with all the advantages we have in such a place, then of course we should operate upon them where they are, at their homes.

Dr. Cecil, in his paper, has touched the keynote when he says that cesarean section and symphyseotomy are operations of election. Craniotomy, in this day of asepsis and with our improved methods of pelvimetry, is never allowable upon a viable child. I believe we are in a position to-day to positively assert this. With our improved and almost perfect technique we have so much better results. In a report of cases that has been made by Pinard and others the mortality is very low. In the last report of Pinard there was a mortality of only one death in a series, I believe, of thirty-five operations, the mothers having all recovered. With our perfect methods there is no reason why we should continue to have unsatisfactory results, and if we can make the operation one of election, and not one of necessity, operating as a last resort, we will get good results. The trouble is that the operator is not called in until labor has been in progress three or four days, when the patients are completely exhausted, and then we can not hope for any better results.

DR. PRICE (closing the discussion on his part): Owing to the fact that I omitted some sections of my paper and read some other portions of it very hurriedly, Dr. Harwood failed to get the general drift of my remarks. I said it was sometimes necessary to tear through the placenta when it was centrally situated.

As to the question, when is it necessary to interfere in these cases? The point I wish to emphasize is that when your diagnosis is made you should interfere just as soon as you have the first hemorrhage. You want to put the patient in such a position that no further hemorrhage can ensue.

In reference to the remarks of Dr. McChord, he recommends hot water exclusively as being very efficient, but it is not always free of danger. The water may be thoroughly sterilized, but if you use it enough it carries with it an element of danger, in that it coagulates the blood in the uterine sinuses which may possibly become infected subsequently and become a source of danger in that respect.

The doctor misunderstood me as recommending the application of gauze within the cervix. That would be exceedingly dangerous practice. If you insert a small quantity of gauze within the uterine cavity it will perhaps check the hemorrhage as effectually as if you put in all that it would hold. I think the next best intra-uterine application is to saturate a piece of gauze with turpentine, carrying it into the uterus and squeezing it out. It is antiseptic, and carries with it no danger at all. You should see your patients early, and educate the public up to its importance.

My friend, Dr. Brown, misunderstood me a little in reference to the anesthetic I use. My preference is chloroform, and I always use it, unless there is some contra-indication. But in a case of severe hemorrhage, or in those cases where the patient is exhausted, I think ether is then preferable to chloroform, otherwise I would always use chloroform.

I fully agree with the remarks of Dr. Bailey with regard to securing and maintaining contraction in these cases. I also agree with Dr. Yager that if we have one case of placenta previa we never want another.

DR. E. E. HUME, Frankfort: If hot water will coagulate the blood in the uterine sinuses, and is a source of danger on that account, what would turpentine do?

DR. PRICE; I do not know that I can answer the question in a satisfactory way. I think that inasmuch as hot water increases the coagula without any antiseptic quality in it, it is perhaps more liable to become a source of sepsis than if we were to use turpentine.

DR. CECIL (closing the discussion on his part): I have only a few words to say. In the hurry with which Dr. Price had to go over his subject, which is so immense, he did not have time to dwell upon the points at length. There is one point that has not been discussed and which I consider of very great importance, and that is that in extreme cases of hemorrhage from any cause, either *ante-partum* or *post-partum*, we have in the saline solutions (six per cent) a remedy which ought not to be forgotten. I have seen this practiced in gynecological surgery with such happy results that I think it ought to be remembered in those cases of extreme hemorrhage under discussion, because we do not see in any kind of practice deaths that occur oftener than in obstetrical work. It is easily prepared, it is at every house, and I think that a great many women would be saved by the injection of common salt solutions in the quantity of a half pint or a pint underneath the skin, or rubbed in vigorously.

I regret that some of the gentlemen who discussed the question of placenta previa, which is always an interesting one, did not have something to say about the rather bold suggestion I made in my paper, that is, that placenta previa centralis is an indication for cesarean section without deformity.

DIAGNOSIS OF THE PRESENTATION AND POSITION OF THE FETUS BY EXTERNAL ABDOMINAL EXAMINATION.

By John M. Foster, M. D.
Richmond, Ky.

The diagnosis of the position of the child by an external examination of the mother's abdomen is familiar to some of you, who perhaps carry out the method in your practice, but from the paucity of the literature on the subject, and from conversation with a number of my fellow-physicians, I am fully satisfied that there are some who are not familiar with the subject, and but few who carry out this method of diagnosis in their practice. Under the name of the "Touch Course" this method of diagnosis has been taught for some time in Germany, and especially at Vienna where the course is very popular; but only lately have the American colleges been giving the subject any attention. The instructions for diagnosing the position of the fetus before confinement, as ordinarily given in our text-books, are so few and indefinite that they offer but little assistance. There is, however, a little manual published by Saunders, of Philadelphia, entitled Outlines of Obstetrics, by Jewett, which gives rather complete rules for this method of examination, as well as other valuable practical information pertaining to obstetric work. I can not hope in this paper to go fully into the subject, but hope to awaken an interest that will lead others to pursue the study in their own individual practices. There have come under my observation within the last year twenty-seven obstetrical cases; twenty-three of these were in my own prac-

tice, the other four in the practice of others. In all of my own cases I saw the patient from one day to one month before confinement and made a careful examination of the abdomen by palpation to diagnose the position of the child. In only one case was I in doubt as to the diagnosis, on account of the great tension caused by the amniotic fluid. In the first nineteen cases I found a normal position and presentation, as was afterward verified at the delivery. I began to think it was a case of "love's labor lost," but the twentieth case proved to be an occipito-posterior position, and on being called by telephone two weeks later, when the first pains of labor began, before the waters were broken, I succeeded by combined internal and external manipulation in rectifying the malposition and delivering a living child two and one half hours later. By inserting two fingers of the left hand into the vagina to push the fetal head up and out of the pelvis, then by proper manipulation with the right hand on the side of the abdomen, working of course in the intervals between pains, the operation was not difficult.

The four cases seen in the practice of other physicians had each advanced too far to hope to rectify the abnormal position, for they were all abnormal. One case was an occipito-posterior, delivered with forceps after much difficulty (still-born fetus). One footling and two breech cases, all very protracted, with a still-born fetus in all. I do not wish to be dogmatic in my assertions, but believe that the majority of these malpositions can be rectified if seen early in labor before the waters are broken. The diagnosis of the normal position, right or left occipito-anterior presentation, is comparatively easy, and is determined in the following manner: With the patient in the dorsal position, with the legs flexed, having the abdomen exposed or only covered by a thin garment, we first find the breech by making deep pressure over the uppermost fetal pole with outer edge of the hand, which is placed transversely to the axis of the patient's body. Having recognized

the breech by grasping it as nearly as we can in the palm of the hand, remembering that it is smaller than the head and less resisting and not so round in outlines, we next pass the palm of the hand along the back of the child (which is recognized by its broad, long, and resisting surface) until we reach the anterior shoulder, which is distinguished by its prominence as well as its anatomical characters. Next, to find the head, place the tips of fingers of each hand just above the symphysis pubis somewhat apart, making deep pressure down into the pelvis at at angle of forty-five degrees. We recognize the head as being hard and round and by our ability to rotate the same easily, also by finding a sulcus between the head and shoulder. Finding at what point the fetal heart sound is heard most distinctly will assist us still further, as it locates the lower angle of the left scapula, and in a normal presentation should be heard in the lower uterine segment.

Now, having outlined the method of recognizing a normal position, I shall, for the sake of brevity, only give a few leading points in the recognition of abnormal positions, for this is a subject that each one must study for himself at the bedside in a practical manner.

Should there be an occipito-posterior position we would fail to find the child's back anteriorly, but instead the small parts of the child presenting themselves to the palpating hand, and in a relaxed abdomen they can be distinguished easily. We would also find an undue cephalic prominence at the lower uterine segment.

In a breech, knee, or footling presentation, whether it was a sacro-anterior or posterior, we would recognize the head at the upper segment of the uterus by its round outline and hardness, and our ability to rotate same, and we would be able to find the sulcus between the head and shoulder; while at the lower segment of the uterus we would find the breech not so hard nor so regular in shape.

Transverse presentation will present but little difficulty.

Twin pregnancy is indicated by the large size of the abdomen with lack of motion in the uterine contents, great width of tumor, greater number of prominent parts to be felt: perhaps two dorsal planes or three or four fetal poles; but, as multiple pregnancy occurs so seldom, I would caution you not to mistake the placenta for a fetus, for often the placenta makes itself very prominent in these examinations, especially when a uterine contraction is excited.

With regard to other abnormal presentations, such as face, brow, hand, etc., we could gain very material assistance from a vaginal examination.

I shall not undertake in this short paper to give the various methods of rectifying these abnormal positions and presentations, but will say that by diagnosing an abnormal position before confinement, and then before the waters are broken, with proper external or combined external and internal manipulation, many children may be saved who would otherwise be still-born; and although you may examine many cases before finding an abnormal presentation or position, yet when you have found one and rectified the same you will be in the frame of mind of the Good Shepherd who rejoiced more over the one sheep which was found than over the ninety and nine which went not astray.

We all feel proud of the reduction in the maternal mortality from childbirth, which has been brought about by a knowledge of what constitutes surgical cleanliness in obstetrical practice; but in our rejoicing over this triumph I hope we will not forget that the infant mortality is still too high, and it is to be hoped that with a better knowledge of the female pelvis, with accurate measurements of same before labor, combined with an early diagnosis of the position and presentation of the fetus, we will gain another victory in the reduction of the infant mortality in childbirth.

To be forewarned is to be forearmed, and it is a principle of warfare never to underestimate the forces of your antago-

nist. So the conscientious, painstaking obstetrician, who is called to attend a woman in labor, when he has beforehand measured the pelvis and diagnosed the position of the child, is not handicapped like his fellow-practitioner who has neglected these precautions. This satisfaction of feeling that you know your case, and are thereby master of the situation, will afford you a feeling of security and satisfaction that will amply repay you for the time spent in getting that information; although it is well to allow the proud father to moderate his excessive joy by making still further compensation for the extra attention given.

I trust the time is coming when a physician, meeting with an abnormal position of the fetus or finding a necessity for a cesarean section or a symphyseotomy after labor has begun, and not anticipating the same by having diagnosed the condition beforehand, will be placed in the same category with the one who has a case of puerperal fever to contend with from neglect of cleanliness.

During the past year I have derived much pleasure and profit from the study of obstetrics, both theoretically and practically, and to those of you to whom obstetrical practice has been an uninteresting task, I would say devote more study to the subject, and I assure you that your increased knowledge will lend a new charm to that branch of the practice, and, by giving your obstetrical cases more attention before confinement, thereby hoping to reduce the infant as well as the maternal mortality.

DISCUSSION.

DR. FRANK C. WILSON, Louisville: I was very much interested in the paper of the essayist, and the subject is one to which I have given considerable attention in years past, and one that I have taught for a number of years. There is one point in the paper that I noticed, and that is that Dr. Foster placed no reliance upon auscultation at all, but he seems to rely entirely upon palpation. We can derive a great deal of assistance from auscul-

tation, and I think it ought not to be set aside. The position which the fetus occupies in the cavity of the uterus is one of an ovoid mass. It is folded up, as it were, as an ovoid mass, in one half of which is located the heart, and of course in whichever segment we can hear the fetal heart, in that segment we usually look for that half of the ovoid mass. If in the ovoid shape the fetus is folded in the cavity of the uterus, you pass the hand half way between the head and the breech, you will find the heart located. Therefore, in whichever segment of the uterus we can hear the fetal heart distinctly, in that half we usually find the head, and that will give us valuable data from which we can make inference as to the presentation. For instance, if we hear the fetal heart in the lower segment of the uterus, of course the head must be downward; we shall have therefore a head presentation. If, on the other hand, we hear the fetal heart more distinctly in the upper segment of the uterus, the head within, the breech must be down.

Another point is with reference to the position which the child occupies with the arms flexed upon the chest and the back of the arch, and resting, as it were, against the uterine walls with the entire anterior aspect of the fetus occupied with amniotic liquor and the folded limbs, the sounds from the fetal heart will radiate in every direction, but will pass through the back with less interruption than anteriorly. With the hand placed over the back the sounds will be heard more distinctly than in front; therefore, when the heart-sounds are more distinctly heard at a certain point, we know the back of the child lies in that direction. That is another valuable point from which we can infer as to the position of the child.

It seems to me the doctor did not sufficiently direct our attention to the valuable assistance which these methods of examination might render in a transverse presentation. I would like to have heard him dwell more particularly upon that point. In my own experience, which now extends over twenty-five years, I can recall a number of instances within the last five or six months in which I was called to see a case prior to the rupture of the membranes. When first engaged upon a case I always suggest the necessity of making an external examination, and as a rule I find no objection urged against it. No woman will object when the matter is explained to her, and more particularly

the value of it and the assistance it might render, as well as the comfort which it may give. The knowledge that every thing is natural and normal aids us very materially in case there be any abnormal position of presentation of the child. In this case I referred to, in making an examination I detected the head very distinctly, it could be felt on the left side, and the breech on the right. The back could be felt in front very plainly. The heart could be heard a little to the left side of the median line. That gave us a shoulder presentation unmistakably, with the right shoulder presenting. In a short time the membranes rupturing would have allowed the arm to protrude and would have necessitated manual assistance, would have necessitated passing the hand into the uterus, bringing down the feet, increasing vastly the danger to the mother as well as to the child, possibly sacrificing the child's life in the manipulation. Recognizing this condition, I simply, by placing one hand externally above the head and the other hand below the breech, by manipulation pressed the child around so as to bring the head down and the breech up. Then it was naturally transformed into a normal presentation, the child being delivered without any inconvenience or trouble.

DR. CARL WEIDNER, Louisville: I can fully endorse the statements made by Dr. Foster, as well as those of Dr. Wilson. I have been astonished to hear that this method is hardly in vogue in our profession in this country, or is not very much taught in the schools. I do not know how it is to-day, but when I was a student, in my practical studies in obstetrics with Professor Strassburg, every woman to be delivered was first examined externally, and we had to make a diagnosis of presentation by this method of palpation before making a vaginal examination. Furthermore, I will say this, that ever since I have been practicing medicine I make it a rule, if I am engaged to deliver a woman, to see her three or four weeks before that time and make an examination by this method. I would not think of making a vaginal examination except under special indications. I make an examination both by palpation and auscultation, then I wait for the time, and if I find any indication of abnormal position, I am on the look out. I think it is a good plan to follow.

TREATMENT OF PUERPERAL SEPSIS.

By Louis Frank, M. D.
Louisville, Ky.

While advances have been made in medicine and surgery, obstetrics has not lagged behind, as witnessed by the treatment of puerperal sepsis. That these changes have been radical is evident to any one who will compare the text-book of to-day with that of a few years ago, or will compare the literature of the present decade with that of the past.

To what is this radical change due? Why is it that we no longer bleed or purge or give opiates and apply abdominal stupes? Not to conjecture, not to chance, not to personal prejudices and likes, but to a scientific reasoning based upon bacteriological and pathological research.

Let us study for a moment, then, the etiology and pathology of this form of sepsis. There is no longer any question that we have to deal with a septic condition, or that the cause is to be found in the invasion of pyogenic organisms. I have heretofore contended that the accoucheur alone is to blame for this trouble, but I have modified my views, basing my opinion upon cases of peritonitis where the infection was a result of disease antedating childbirth or pregnancy, and the easy possibility of infection occurring during the puerperal state as it did in these cases.

We are aware that pre-existing pyosalpinx or other pelvic trouble, such as tumors, etc., may be the causes of *post-partum* sepsis. I have recently seen, assisting in the operation for its removal, a large dermoid that had undergone suppuration as a result of trauma to the tumor during labor. We

know also that tumors may become gangrenous from pressure or twisting of the pedicle during labor.

Pre-existing gonorrhea may cause sepsis, as may any other pathological condition of the genital organs which antedates delivery. The conditions often are not discovered until too late to institute prophylaxis. Those pre-existing conditions we will not consider in this paper.

Notwithstanding the fact that infection is most frequently from the hands, instruments or dressings of the obstetician or nurse, as shown by the marked decline in the occurrence of post-puerperal trouble since the introduction of aseptic methods in midwifery, there may also be local conditions in the genital tract below the internal os which play an active part in promoting infection, and without which it would not occur. Among these are laceration of the soft parts, however slight, and the more extensive change following tardy labor in the second stage.

Organisms, among them often infectious ones, are constantly resident in the vagina, and these find easy access through the abrasions in the soft parts. The gonococcus may invade the deeper structures, or even after delivery infect the uterine mucosa, tubes, ovaries, or peritoneum. The changes and local conditions are manifold, varying from an endometritis to a purulent metritis, from a slight sapremia to a septicemia or pyemia.

In the production of pus-tubes puerperal infection is one of the most frequent causes. The open surface, left in the uterus by the detachment of the placenta in labor at term or after abortion, affords an excellent point of ingress for pyogenic organisms. "The enlarged lymphatics and blood-vessels torn across, the processes of degeneration following the completed term of pregnancy, almost pathological, afford a most receptive surface for absorbing, developing, and diffusing the slightest contamination by septic matter. An amount of septic matter will suffice to infect a woman under these

conditions which would be resisted and overcome by the normal non-gravid uterus."

The treatment is dependent directly upon the condition present, so that the differentiation of the changes which have taken place is all important. We must consider in our treatment those cases where the genital tract has been normal before labor, and those cases where a lesion exists at the time of labor. Among the latter, as I have said, may be mentioned various pelvic and abdominal troubles, which might properly be included under the head of cases amenable to preventive treatment. The indications for treatment of such conditions, when discovered before pregnancy, are very plain, and there is no longer any question as to the course we should pursue.

Under the head of preventive treatment, it is necessary then to examine carefully into the history of the patient for pre-existing troubles of this nature, also for gonorrhea, and to observe the condition of the mucous membrane of the vagina before labor. If gonorrhea exists or has existed, the vagina should be rendered aseptic by the methods now in vogue for that purpose. The same is true of carcinomata or any new growths ulcerative in character, such as chancre, etc. I have seen septic peritonitis caused by infection from a chancre, also from gonorrhea, and have demonstrated positively the relation between the cause and effect by a bacteriological examination and by the history of the patient. As to those cases produced by operative interference during labor and by the attendant little need be said, as these causes are well known and should be always guarded against.

Infection is often due, as indicated above, to the existence of lacerations and abrasions through which the organisms find entrance. As a result of this infection we have, as the mildest form, a septic endometritis, the pain being usually localized in the uterus, there being a discharge of foul-smelling pus, with the temperature characteristic of suppuration.

Such cases are not necessarily fatal, the rule being that the infection remains for a time local, then spreading slowly to contiguous structures resulting in localized peritonitis, the uterus becoming adherent; or we may have a salpingitis or pyosalpinx with or without ovarian or broad ligament abscess.

A more severe infection, either from a larger amount of organisms entering or from more virulent poisoning, may result in a more rapid spreading of the microbes into the surrounding structures, and to rapid pus-formation in the tubes or in the broad ligaments, or the pus leaking out of the tubes may produce the most virulent purulent peritonitis. Then, again, the local infection may be very severe and extensive; the pus formation may remain entirely localized to the uterus itself, or to the uterine body and subjacent peri-uterine tissue. The organ is either very soft and boggy, or may be riddled with small pyemic abscesses. To this condition we might apply the terms diffuse purulent metritis and septic parenchymatous metritis.

Another condition which may exist is the formation of septic thrombi in the sinuses, emboli being carried into the distant organs, resulting in true pyemic processes. When the infection remains local a rapid sapremia may be set up, causing death in a short time, or at any time a pyemia or septicemia may supervene.

The treatment, then, may be considered under several different heads:

First: Those cases where the infection is the result not directly but indirectly of lacerations in the soft parts, there being localized suppuration at these points.

Second: Those cases where septic endometritis exists.

Third: Where pus-tubes or sacs in the broad ligaments are found.

Fourth: Purulent metritis and parenchymatous metritis.

Fifth: Purulent peritonitis.

Sixth: Sapremia, septicemia or pyemia.

(1) In the first class of cases it is necessary to thoroughly excise or curette the lacerated surfaces, washing them with an antiseptic solution and packing or draining with aseptic gauze. If there is no great loss of tissue, or if this is not extensive, the granulating surfaces may be approximated by means of sutures and dressed aseptically. Daily irrigation for a few days with fresh packing will result in rapid improvement. Any local collections of pus must be evacuated and the cavities drained.

(2) *Septic Endometritis.* This will probably be one of the most frequent conditions we will be called upon to treat, and upon its intelligent treatment depends much, not only as to the immediate outcome of the case, but as to the severe after-effects which are so apt to follow this trouble. The pathological condition locally is one of an inflamed or intensely congested endometrium, with a large, fresh, raw surface at the point of placental detachment, affording ready means of ingress of organisms in the uterus. The endometrium is soft, often decidual shreds partly or in whole decomposed are found, or there is as a result pus formation. This pus may remain in the uterine cavity or escape slowly through the patulous os. The pain is localized to the uterus, though this organ itself is not necessarily much enlarged. The treatment is the same as for pus elsewhere, and the rule *ubi pus evacuo* is of particular importance. Failure to properly and thoroughly remove septic material means little or no improvement and further infection. No internal medication is of avail, and the giving of quinine or other agents to reduce temperature or combat the poison without removing the infecting material is absolutely useless and a loss of valuable time. Do not delude yourself into believing that the condition will pass off in a few days, or that you may be mistaken in your diagnosis, but proceed surgically to combat these virulent micrococci. It is as a result of septic endometritis that the very worst forms of puerperal troubles occur, the

most severe is that where the disease spreads by the lymphatics to the peri-uterine tissue and peritoneum, which, by means of treatment, may often be prevented. When we have a chill, high temperature, and pain coming on shortly, within twenty-four to ninety-six hours after labor, without symptoms of extra-uterine trouble, the curette with irrigation and aseptic gauze packing is by far the best plan of treatment we have. The curette is the most valuable curative agent we possess, and succeeds where only drainage or irrigation and drainage fail completely to hold in abeyance or check the onward progress of the disease. Women who have been irrigated two or three times daily for a week or ten days, without improvement, have shown an immediate improvement after curettage in my hands. For this purpose it has been my custom to use the sharp curette, which, in the hands of those educated to its use, and who are able to recognize normal from abnormal tissue, is absolutely without danger. In the hands of those unaccustomed to its use I would not advise the sharp curette, but one having a somewhat blunted edge. The operation then in itself we may say is entirely devoid of danger, unless it be from perforation, and, as I have said, this is very unlikely to occur in skilled hands, or when the operation is carefully or properly done. Very seldom is an anesthetic necessary, the cervix being always sufficiently dilated. One point I should lay stress upon, that is, not to pack the uterus too tightly after curetting, as we do not desire to tampon the uterus, but to use gauze merely for the purpose of drainage. The gauze may be removed after twenty-four to forty-eight hours, and an intra-uterine douche given and the vagina loosely packed. This in turn may be removed after two or three days, and daily vaginal douches given for a short while.

(3) *Pyosalpinx, Pelvic Cellulitis, and Abscess.* The first of these, pyosalpinx, may succeed an infectious process very rapidly, spreading by continuity of structure at times, and

this being true in chronic cases, or it may come on very rapidly as a result of lymphatic infection. I would not include in this category for treatment those cases of pyosalpinx which occur as a sequel to chronic septic endometritis, but confine my remarks to acute cases. The diagnosis may be very difficult, or may be made only under an anesthetic and after a careful examination. It would be important to distinguish whether one or both tubes were affected. Here, also, medicinal treatment is of no curative value, but the administration of tonics, good food and salines are advisable as preparatory measures to salpingectomy. As to the best method of operating, there can now, in the light of recent clinical work, be no question but the low operation is better. This method of operating is also applicable to perimetritis or broad ligaament abscesses, and is in that instance undoubtedly the best plan of procedure. Another reason for advocating the low operation is, that when operative procedure becomes necessary we should not only consider the immediate result, but also the condition in which our patient will be left after the operation. Although my experience has been limited, and the cases which I have observed are not numerous, I have found that in the low operation done for pelvic disease patients are able to be out of bed in from six to eight days; there has been less nausea and other troublesome symptoms which usually follow operations by the abdominal route. As drainage and rapidity are points to be especially considered, it is preferable to operate with the clamp. The use of ligatures in these operations not only lessens drainage, but there is great danger of infection from the ligature, which is entirely done away with by use of the clamp.

(4) *Purulent Metritis, and Diffuse Septic Parenchymatous Metritis.* This is one of the most serious and dangerous conditions resulting from infection. It may also be prevented by curettage and drainage, but sometimes even in spite of the utmost care and energetic treatment it will occur. The

treatment to be of any avail must be carried out at once and allows of no delay, notwithstanding it is one of the most dangerous in pelvic work. The only procedure available is hysterectomy, and, as in pyosalpinx and pevic cellulitis, operation from below is preferable. Fortunately few cases occur, and those reported as operated upon are indeed rare. The operation is undoubtedly at times a life-saver, as some of the gentlemen present will testify. Of course, as before mentioned, the dangers are very great and the outcome even in spite of operative interference often fatal. I believe, as previously intimated, that in these last two classes of cases operation by the vaginal route is undoubtedly the better plan. By this method we have a ready channel for drainage, the after-results are by far better, and above all there is no danger of infection of the general peritoneal cavity by dragging diseased structures through it, as is necessary by the suprapubic method. Where there is merely a pus sac, it is also better to operate from below. Where pus sacs, however, are very high, or where there is any evidence of disease of the peritoneum more general in character, the high operation or abdominal route may be preferable. This is especially true where we desire to flood the peritoneal cavity. It would be well even after the abdominal operation to drain through the vagina at the same time. I desire to be put upon record as advocating hysterectomy for the puerperal infected uterus, when, after the treatment previously indicated, no improvement has followed after twenty-four to forty-eight hours, and where there is no amelioration in the severe symptoms present.

(5) *Circumscribed or Diffuse Purulent Peritonitis* may either come on within a short time after infection, or may not exist until later, when, the tubes being primarily filled with pus, there is leakage by rupture or by seepage through the not firmly united fimbriæ. Unless the collection of pus is circumscribed, and by this I mean contained in the pelvic or

inferior portion of the peritoneal sac, the outcome is necessarily fatal. The pus in diffuse peritonitis is so scattered throughout the cavity that it is impossible to evacuate it perfectly, and the organisms themselves are so virulent that often even before much pus is found the patient is *in extremis*. But, where the agglutinated intestines confine the pus to the lower part of the cavity, much may be done by incision and drainage, either above or below. Should the sac extend out of the pelvis the suprapubic incision with thorough drainage from below would probably be the better, for the reason that irrigation may be done with much less danger of tearing up intestinal adhesions. This form of peritonitis may go on to recovery in a short time, or it may persist for years. If diffuse, and the result of lymphatic infection, nothing can be done by celiotomy, as the uterine and pelvic lymphatics, the seat and origin of the trouble, are not affected by the operation. Before peritonitis develops treatment by the curette may be of some avail. All cases so far operated upon after spread of the infection have died. After septicemia has set in nothing is hoped for by any sort of interference, and even before this a radical operation like hysterectomy offers little if the peritonitis has become a marked feature. Only then in local peritonitis with local lesions is operation to be done, or early in peritonitis without demonstration of the general spread of the infection, if there is no marked improvement after less radical treatment.

"At the present time it is safe to conclude that the prognosis of celiotomy done for general puerperal peritonitis is fatal. In cases of localized peritonitis it is best in those cases in which the inflammatory process has become well localized and in which sepsis is absent, the case having resolved itself into pyosalpinx, abscess of the ovary or pelvic abscess of puerperal origin. The prognosis is fairly good in cases of circumscribed peritonitis operated upon promptly, that is, within two or three days. Cases which have gone from bad

to worse, and in which the operation is done as a last resort, usually terminate fatally."

(6) The treatment for *sapremia*, *pyemia*, *and septicemia*, is to be based largely upon the conditions found, bearing in mind always that the outcome of septicemia is necessarily fatal, while in pyemia, should abscesses be few and localized where they can be evacuated, we may hope for better results.

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DISCUSSION.

DR. L. S. MCMURTRY, Louisville: The subject that has been so thoroughly and carefully presented by the essayist is by far the most important one that is daily engaging the attention of gynecologists. It has long been a well-recognized fact that a large proportion of cases of pelvic inflammation of various grades and degrees that have come within the range of operative gynecology originate in puerperal inflammation, and it has been only recently that surgery has been brought to bear upon the

class of cases that are treated by the essayist so well in his paper presented this morning. I wish to state in general that the exposition of the subject made by the essayist is about the most finished contribution that I have heard. I believe this line of work is attracting more attention and observation among gynecologists than any other subject. It is in a more settled state, and yet advance is being made. Recognizing the fact that I have little time at my disposal, I will simply call attention to one or two points. We have been in the habit of looking upon puerperal fever as being a condition entirely without the range of surgery, and it is a fact that the puerperal condition is to a great extent a barrier to successful operative procedures. But there is a certain class of cases coming under the generic term of puerperal fever, where, after a general septic infection of minor or major degree, there is a positive localization of the inflammatory process in the uterus and uterine appendages. The puerperal condition *per se* should not be considered as a barrier to operative interference, and these cases should be studied from the standpoint of pelvic surgery more than from the unsatisfactory process of general medication. When puerperal peritonitis has apparently subsided and the patient still does not recover, but has daily exacerbations of temperature with sweats and other evidences of local pelvic suppuration, it becomes the duty of the physician to bring to the treatment of that case surgical means of relief, and in a large proportion of cases there will be found well-defined lesions of the appendages which will be amenable to surgical interference. I have operated on several cases myself of puerperal pelvic inflammation of a desperate character, involving the appendages, and in each one of them it was necessary to do a hysterectomy. In one case the uterus could not have been found without opening the abdomen; it had undergone destructive inflammatory changes, so that it was in a sloughing condition with suppuration on each side. A hysterectomy was a necessity. In another case the uterus was yellow with foci of pus underneath the peritoneum; it had just riddled the uterus, so that it was the focus of suppurative inflammation. Hysterectomy was also done in this case. Both cases recovered. I am satisfied without surgical interference they were doomed. I simply make this point. The subject is entirely too extensive to go into detail in the limited time at my disposal. At the meet-

ing of the American Medical Association in Baltimore a disposition was made by the Section on Gynecology and Obstetrics to indicate by general symptoms and by time limitations that an operation should be done in puerperal pelvic peritonitis, metritis, salpingitis, etc., that is, that when a woman has had an attack of puerperal inflammation, and after a certain number of days, when irrigation and curettage of the uterus have been employed, the fever still remains at a certain grade, and the pulse likewise, the operation of hysterectomy ought to be done. I wish to enter my protest by stating that there is danger in this class of cases of carrying operative interference too far, of being carried away by the novelty of it. These cases should be operated upon for palpable lesions in the pelvis that justify operative procedure. These cases should be watched more closely with a view to bringing them within the range of operation, for there is no doubt that a large class of cases, considered almost hopeless after a long critical septic process, can be rescued by timely and appropriate surgical interference.

DR. ARCH DIXON, Henderson: I just want to say a word or two in regard to Dr. Frank's paper on the treatment of septic endometritis. I fully agree with him that infection extends to the parenchyma of the uterus and we have a suppurative metritis, and curettement and packing of the uterus demand our immediate attention. There are only two ways by which infection can take place in these cases, and one is by direct extension from the uterus itself, and the other by lymphatic absorption.

The question in regard to operating is one of very great importance. In cases of suppurative metritis with extension of the disease from the tubes and ovaries, we are apt to have local peritonitis with localized abscess, and in such cases an operation is necessary and should be done. The point I want to emphasize is this, that when you get deep systemic infection medical measures in my experience do no good, and we should endeavor to differentiate this deep systemic infection from localized peritonitis with the formation of abscess, and I think every man who comes in contact with these cases should take that question into account and ponder it deeply, because you may do an operation which will not only bring surgery into bad repute but yourself also. If you have a case hopelessly infected by lymphatic absorption the patient is going to die, I do not care what you do. In

other cases an operation is necessary and ought to be done. Very often the symptoms of a local peritonitis are much more aggravated than those met with in a general peritonitis from systemic infection. It is a nice point to distinguish between the two; in other words, to know when and when not to operate. I believe with Dr. McMurtry that an operation should be done where we have a local peritonitis. On the other hand, we may do an operation on a patient who is hopelessly beyond all hope either surgically or otherwise; the patient dies, and you bring operative measures into discredit, and in that way it would be better, perhaps, if you differentiate the two classes of cases and leave the bad ones alone.

DR. WILLIAM H. WATHEN, Louisville: If no other paper had been presented to this Society than the one to which we have just listened by Dr. Frank, we would all be repaid for our time and expense. He presents this subject in its most modern aspect and in a manner that has not been presented to us by ordinary text-books that have governed the practitioner in the treatment of puerperal sepsis. At Baltimore this subject was recently discussed before the American Gynecological Society, and also the American Medical Association, and the conclusions were about the same as those presented by Dr. Frank. What is to be done in one case should not be done in another. If the infection following delivery is the result of a previous pathological condition in the pelvis, the case should be treated by abdominal section or hysterectomy just as it should be treated for similar conditions at any other time. If the infection is conveyed from the birth-channel, then the treatment may vary in accordance with the effect that the germs have upon the local structures, or upon the adjacent structures, or upon the system at large. If the poison is confined to the endometrium and we find no involvement of adjacent structures, thorough curetting, irrigation, and drainage will very often cure these patients. If the disease has spread from the fallopian tubes and has caused acute pyosalpinx, or rather peritonitis, then the case should be treated by something more than curetting, and nothing short of the removal of the diseased structure will cure the woman. If the disease has extended from the lymphatics and veins into the peritoneum and has brought about a general suppurative peritonitis, or if the pathogenic germs or the products of bacterial growth have entered the

system and your patient is suffering with profound general sepsis, no operation as yet performed has done any good. If the condition is localized in the pelvic structures by an accumulation of pus in the broad ligament, or sacculated pus in the pelvic cavity with one or both tubes probably diseased, then operative means are indicated and the sooner we perform the operation the better. Now, I am an advocate of early operation, because if we can save any case of lymphatic infection it must be by early operation. I am positively in favor of the vaginal route. I can hardly conceive of any case where an operation for the removal of the appendages with the uterus is indicated that it should not be done *per vaginam*, because if the tubes are ruined functionally, the uterus should not remain because it is of no value. By the vaginal route we can remove the appendages with much less shock, lower mortality, and we can drain more perfectly. We can prevent easily more infection of the abdominal viscera, and instead of having our patient lingering between life and death for weeks, as is invariably the case when the abdominal route is selected, within ten days these women are sitting up, and no one can appreciate the value of the vaginal route except the one who has done the work. The vaginal route naturally forces itself upon me. When I take a woman with a pulse of 140, with accumulations of pus on each side extending to the umbilicus, with distended abdomen, a temperature of from 103° to 105°, and operate upon her and have her sitting up in ten days, I must be convinced of the benefits of the operation, and every patient on whom I have operated for sepsis following the puerperal period has been able to sit up at the end of seven days, and all of them could walk more or less at the end of ten days. In the treatment of puerperal sepsis involving the broad ligaments and in the acute form, we should incise the vagina behind the cervix, open the broad ligaments, thoroughly expose the infected connective tissue, irrigate, tampon, and drain with iodoform gauze.

DR. W. C. DUGAN, Louisville: The statement made by the essayist, that all cases of general suppurative peritonitis are necessarily fatal, should be qualified. I have had two cases in the last year of general suppurative peritonitis, and by opening them up thoroughly and cleansing them they have gone on and made uninterrupted recoveries. Granting that most of the cases die, if we can save one patient it is certainly worth a trial, and my

experience in the last year has been very satisfactory in that I have operated upon these two cases and they recovered.

Dr. Wathen's experience has certainly been very unusual to relieve these cases in ten days with such extensive suppuration as he mentioned.

DR. FRANK (closing the discussion): I thank the members for their generous discussion of my paper, but I desire to correct one or two impressions which seem to prevail, and first, in reference to a statement made by Dr. Dixon. I believe I stated in my paper that for a septic metritis hysterectomy was to be done, that curetting was for septic endometritis. Also, I believe in the last sentence or so of my paper I stated that if septicemia existed these patients should not be operated upon, as very little could be hoped for by surgical interference.

With reference to the statement made by Dr. Dugan, I stated that in puerperal purulent peritonitis nothing was to be hoped for; that as yet there were no cases on record as having been cured, stating as a reason for it that a septic uterus was being left behind to constantly reinfect. I believe, if we could wash out every particle of pus and at the same time remove the uterus with the appendages, we might hope for better results, but so far no cases have been reported of cures of this particular type.

I agree with Dr. McMurtry that we should only operate for palpable lesions, and it is very often necessary to examine patients under an anesthetic to demonstrate these lesions. After these demonstrations our treatment can then be determined. After curettage we should not be led to hope for too much. Even after the symptoms subside the patient should be kept under constant observation for some time, as small foci of infection remaining behind may light up the old trouble and septic peritonitis with death rapidly supervene.

SOME FURTHER OBSERVATIONS ON THE RELATION OF PELVIC DISEASE TO INSANITY IN WOMEN, WITH REPORT OF CASES.

By John Young Brown, M. D.
Lakeland, Ky.

At the last meeting of this Society, in a paper entitled "Pelvic Disease in its Relation to Insanity in Women," I made the statement that I believed that twenty per cent of the female population of our State asylums suffered from some form of major or minor pelvic disease, whose mental and physical condition would be benefited by proper gynecological treatment. This statement was made after a careful, painstaking, clinical investigation of the subject among the female insane under my charge at Central Kentucky Asylum, and I may add that my conclusions are in accord with those of Drs. Joseph Price, Rohé, Manton, Alice Bennett, and others who have made similar investigations. It is my purpose to-day to emphasize the importance of this subject and to show you how shamefully gynecology, and I might add surgical work of every description, has been neglected in the asylums of the South.

In order to post myself relative to this matter I several months ago addressed a circular letter to the asylum superintendents of thirteen Southern States, including those of Kentucky, requesting that they inform me what per cent of their female population suffered from pelvic disease, and to what extent operative gynecological work had been done in their institutions. To these letters I received seven replies. The majority admitted that there existed a large amount of pelvic

disease among their patients; few knew nothing about it, as it had never occurred to them to investigate the matter, and a gentleman who has served for a number of years as superintendent of one of the largest asylums in the South, went so far as to say: "I confess that I am prejudiced against operative interference in case of female disease, having seen so many patients recover notwithstanding the existence of marked disease, in some of whom I had expected to do some sort of operation."

Just such confessions as this, added to his knowledge of other neglects equally as serious perhaps, prompted that eminent scholar and able neurologist, Weir Mitchell, to deliver his now famous "dynamite" address before the last annual meeting of the American Psychological Society, in which he pointed out the numerous neglects and abuses daily going on in the asylums for the insane, which are only too patent to those who are in a position to conscientiously compare from a scientific standpoint the treatment received by the insane in the hospitals provided for their care with that received by the sane in the public institutions in which they are treated.

Whether all the indictments of Dr. Mitchell against the managers of the asylums of the country are true or not, one fact stands out boldly, and that is that they are by no means up to that high scientific standard set by those conducting the hospitals set aside for the treatment of the sane.

I have carefully examined the reports of the insane asylums of thirteen Southern States, and I find neither in them nor in the medical journals any record of pelvic work having been done save that done by Dr. George H. Rohé, of the Maryland Hospital, and Dr. E. M. Green, jr., the accomplished second assistant of the Eastern Asylum in this State, and yet there have been confined in these asylums thousands of women, and certainly among these thousands there were many whose sufferings could have been relieved, and

whose minds might have been restored, had they not been denied that relief afforded by operative gynecology which is daily allowed their sane sisters. And, strange to relate, these very asylum men, in the face of this record, are the very ones who condemn the operative work of others, when their published reports show that they have never done abdominal work of any character, and consequently know nothing about it.

In discussing the relation of pelvic disease to insanity in women and the indications for operation, I desire to distinctly state that the only indication I recognize is palpable, patent disease. I take very little stock in the theory of reflex neurotic trouble without a lesion, nor do I believe that pelvic disease *per se* ever resulted in insanity, but I do believe that, in those who are neurotic by inheritance, pelvic disease is a potent factor in the production of the various forms of mania and melancholia which otherwise would have remained latent.

Whatever theories may be advanced against the idea that there exists a causative relationship between abnormal conditions of the sexual organs of women and mental alienation, the fact remains that brilliant results are now being achieved by operative treatment of these abnormal conditions, and these, too, in the hands of men whose testimony can not be questioned.

In the New York Medical Record, August 4, 1894, W. Gill Wiley, of New York, reports a series of cases of mania and melancholia treated by operation, in which the results clearly show the interdependence of the mental condition on the coexisting lesion of the pelvic organs. All of Wiley's cases were examined by able neurologists and alienists, including such men as Spitzka, Landon Carter Gray, and others, who concurred in his opinion and advised operation.

The report of Wiley is of exceptional value, as he was fortunate in having as consultants able, painstaking, and

conservative neurologists. His results were of the same gratifying nature as those which characterized the work of Rohé, Manton, and others, who have initiated in the institutions which they serve a scientific, gynecological service, and have urged in their writings that this most unfortunate class be given the benefit of proper surgical treatment which has so long been denied them.

The following cases are of interest in this connection:

CASE 1. V. K., aged twenty-three; single; case of marked melancholia. On admission to the asylum she was very weak and had to be forcibly fed. She gave the following history: Menstruated at fourteen; had suffered at each period since with severe dysmenorrhea and great pelvic pain. Three years prior to her admission she began to show decided nervous symptoms, with periods of depression and suicidal tendencies. She was treated two years before her commitment to the asylum by a physician of Louisville for "uterine trouble." The treatment, as near as I could learn, was curettage and the adjustment of a pessary. She grew gradually worse, and when admitted to the asylum was very much broken, both mentally and physically. On examination I found the uterus badly retroverted and considerable disease of both appendages. I operated July 25, 1894, removing both tubes and ovaries; tubes were much thickened and adherent. She made an uninterrupted recovery, and began almost immediately to improve mentally, which improvement continued up to the date of her discharge from the institution, three months after operation, at which time she was apparently perfectly well, both mentally and physically, having gained twenty-three pounds in weight. I have a recent letter from her brother, and he writes me that there has been no recurrency of her mental trouble, although her general health is not quite so good.

CASE 2. S. G., aged twenty-eight; single. Diagnosis on admission, acute mania. Patient gave a history of syphilis,

and had had several attacks of gonorrhea. Menstruation frequent and painful; complained of severe backache and pelvic pain. Examination revealed a decided tubo-ovarian disease of both sides. Operated December 30, 1894, removing both tubes and ovaries; tubes thickened, adherent, and contained pus. Patient recovered from operation without trouble. She has greatly improved, and is now sound and well.

CASE 3. C. T., aged forty; widow. This patient has been in the asylum for a number of years. Diagnosis, dementia; was very filthy in her habits, and was kept in dormitory ward for filthy cases. My attention was first called to her on account of almost constant bleeding. On examination I found a fibroid about the size of a hen's egg protruding from the cervical canal. There was a complete laceration of the perineum. I removed the tumor and repaired the perineum. She recovered without trouble from the operation, and has greatly improved physically. She now has control of her bowel, the hemorrage from the uterus has stopped, and she is in every way better off than she was before the treatment.

CASE 4. S. C., aged forty; married. Diagnosis, melancholia. This patient was very filthy and much depressed. She had to be fed with a stomach tube for six months. On examination I found the uterus large and soft; the cervix was considerably enlarged and everted by diseased glands and follicles, and slightly lacerated; the perineum was badly torn. I curetted the uterus and repaired the perineum. The improvement in this case has been very gratifying; the patient is now in one of our nicest wards; she is quite rational, and there is every indication that she will completely recover.

I could cite many other cases in proof of the benefits to be derived from operative treatment, but I will not consume your valuable time, as the cases herein reported are sufficient to illustrate the chief points of this paper. Case 3, one of

dementia, operated on for laceration of the perineum, I have purposely included in this report, for the reason that there are many such cases in the institutions for the treatment of the insane whose lives have been made miserable by the distressing symptoms, the result of bad perineal laceration, and, while there is no hope of mental improvement in cases of this description, they are certainly entitled to the comfort and relief afforded by operation.

DISCUSSION.

DR. L. S. MCMURTRY, Louisville: The subject which has been presented by Dr. Brown is one of such practical character that it not only demands the attention of this Society but the profession generally. During the past year the public have been made aware, through popular magazines and other mediums of communication from the profession, that a great deal is being done surgically for a certain class of hitherto helpless cases in the insane asylums of the country. Families that have these unfortunate cases among them apply to physicians to know what can be done for them, consequently we can not push the subject aside. We can not say that this is altogether a problematical and an experimental field of inquiry that we must for a time let alone. It is a subject that has been brought to the front by some of our gynecic surgeons with the co-operation of distinguished alienists during the last few years, until it has become a practical subject for the attention of the profession and requiring practical treatment at our hands. It is useless to say that nothing can be done for this class of patients. It has been determined by operative treatment that they are the most readily curable under operative procedures of any class of patients that we have to deal with. It is surprising how they do recover from operative measures. Dr. Brown has said, and his statements are corroborated by those of Dr. Rohé of the Maryland Hospital for the Insane, by Dr. Alice Bennett of the Norristown Asylum near Philadelphia, Dr. Landon Carter Gray, and others, that about twenty-five per cent, one fourth of the female population of our insane asylums, are the subjects of organic disease of the pelvic organs. It is not the plea of the

essayist or that of the profession, that all women who are insane and who are the subjects of pelvic disease should be subjected to operation with a guarantee that they are going to be cured of their mental disorders. That is not the purpose at all. But it is this: The condition of these women, so far as comfort and general physical health are concerned, can be very materially benefited or improved by operative procedures, so that their lives may be made more comfortable, and it is the duty of the profession to give them the benefit of their skill. I think we can all, as practitioners of medicine, safely plant ourselves on that point and stand by it. We do not propose this as a universal remedy to rescue a class of people that have for a long time been regarded as hopeless of restoration. Such a thing is not claimed by those who are pushing this work; but it is claimed, that if an insane woman is the subject of a painful disease which is wrecking her nervous system, making her miserable, she should be radically relieved of it, if it is possible to do so, by surgery, even if she can not be restored to her normal state. That is fair, and that is what we have a right to claim. This work is being done in some of the leading institutions in this country to-day. Men of the highest order of integrity, of scientific attainments, in control of the large insane asylums in the East, have perfected operating rooms, and are equipping them for the facilities of modern gynecological surgery, and are attaching to the staff of these hospitals, and making it among the accomplishments of surgeons of insane hospitals, men who have a knowledge of pelvic diseases and who are practicing this branch of surgery in these female hospitals where necessary. The statements coming from these institutions not only prove that the men who are operating are doing a large amount of good, but the men who are interested in this line of work in visiting these institutions see the work that has been done and the results, and a considerable proportion of the cases hitherto considered hopeless have been restored to their homes and families, and a very large proportion of the female population of these insane asylums have been relieved of painful pelvic disease. They have been converted from sufferers into women who are able physically to have all the functions of the body carried on healthfully, and, barring those purely psychical disorders they are possessed of, are in a much more comfortable condition. The tendency of this work is to

improve the condition of the female population of our insane asylums and to rescue a certain proportion from a hopelessly insane condition that hitherto were considered incurable.

This subject is more or less allied to another branch of work which I may be pardoned for a moment in alluding to, and which I consider one of the greatest the profession is engaged in. Take the blind asylums of the country, and the antiseptic methods in midwifery practice are carried to a high degree of perfection, decreasing the number of blind in the asylums of the country to an enormous degree. This is certainly a great field, and it is along the same line as that of pelvic surgery for the relief of pelvic disease in insane women. Here we have a class of people depending upon the body politic, the most distressing and the most unfortunate class that the medical profession can be thrown in contact with, and it is a field for the best efforts of the profession.

I would emphasize one statement made by the essayist that has been insisted upon by all men engaged in this work, and that is they do not claim that a surgical operation should be performed for uncertain neurotic conditions, vague neuroses, where there are no demonstrable lesions of the pelvic organs. Some enthusiastic gynecologists have cast a shadow upon this work by operating upon women who were not legitimate subjects for operation. No operation should be done upon a woman with a view of improving her condition unless there are demonstrable lesions of the pelvic organs as a basis for it.

DR. B. W. STONE, Hopkinsville: I have listened with a great deal of interest to Dr. Brown's paper, and I am sure you will all agree with me that from its bearing it brings up a subject that very intimately concerns the superintendents of the insane asylums of the country. I am satisfied from the conclusions of the doctor that it is certainly the duty of the medical managers of these institutions in the future to pay more attention to these troubles. Possibly I can not speak for all of the managers or superintendents of these institutions in the United States, not by any means. Possibly they have neglected to give these troubles the attention they should receive at our hands. We have been led to do so by the unfavorable results obtained by operators in the East. At Blackwell's Island Insane Asylum at one time a rather important case was operated upon, possibly a little before

the time when antisepsis and asepsis were as much in vogue as they are now, and the patient very promptly succumbed to the operation, when there was really not a strong indication for it. The physician who did the operation had a serious time before the courts, and since that time the managers of the asylums, possibly encouraged to do so by the commissioners, have been a little backward in permitting surgical interference. That has been the case not only in the South, as said by Dr. Brown, but also in the North, very little surgical interference being done in these cases. I am sure, from the doctor's deductions, however, that we should do more in the future in this line of work, and I will promise him my support and encouragement for doing so. Dr. Brown is ably aided in his operations there at Louisville and Lakeland by the surgeons, especially by Dr. McMurtry, who is visiting gynecologist to the Lakeland Asylum. I will state that it is sometimes exceedingly difficult to arrive at a correct diagnosis of pelvic disease in the females in lunatic asylums. We can not arrive at their symptoms by any means, and I have been surprised at the remarks made by Dr. McMurtry, as well as by Dr. Brown, when they say that at least twenty-five per cent of all females in asylums are the subject of pelvic disease. I believe it is the opinion of asylum superintendents and physicians generally that the percentage is not as large as that. It is certainly contended by a very large number of physicians that uterine and pelvic diseases do not play as great a rôle in the production of insanity as is claimed by a great many who strongly advocate surgical interference. I think also, very often when the patients are suffering from this disease in the acute form, it might be improper to operate. I do not think we have a right when we know our patient is going to recover from insanity in a short time to interfere surgically. In a great many cases the physician should feel pretty sure that the pelvic disease is one of the causes of a patient's insanity before he operates; and in the chronic cases, as Dr. Brown mentioned, which are to remain in the asylum for an indefinite period, it is proper to give them all the comfort we can in the remaining days of their life in the asylum.

I do not know that I have any thing else to say, but I am sure that the doctor's paper has very much impressed me, and it is somewhat different from what I had been led to believe from

the doctor's deductions of last year. I think his report of cases produced on me the impression that very little good was to be effected by operative interference; but I understand he does not mean very little good in the way of improving the mental condition or curing it, but very great good comes from surgical operations in that they afford comfort to the patients for the rest of their days in the asylums.

DR. H. H. GRANT, Louisville: I am very glad to have heard Dr. Stone so heartily concur with the paper which has been presented by Dr. Brown, for the reason that he is associated with the same class of patients, and therefore in coming before this Society his statements must have considerable weight, especially as he tells us that he has changed his mind with respect to the utility of these operations. It appears to me Dr. Brown presents positive facts which can not be questioned. It is a question of humanitarianism. Here is a class of patients suffering unquestionably from conditions from which they can be relieved surgically, and because they are unable to describe their trouble, or are made aware of the fact that relief is offered to them, they are neglected—allowed to suffer. There is no question but that society would unanimously favor the taking of any step which would be the means of rescuing any one of these patients. If the operations that are done succeed in rescuing these patients from suffering and restoring them in any way at all to comfort, the operation which Dr. Brown proposes is fully justified. He states positively in his paper that it is only for palpable disease that he operates. If these afflicted women are not as much entitled to relief from these affections as their well sisters, then some other explanation of the justice and rights of people must be presented to us.

With respect to the conditions which surround the operation; with respect to the capability of the surgeon to make a diagnosis and the class of work, it is only necessary to state that no man should undertake any character of operation in which he is not competent to determine the character of lesions for which he operates and is successful in pursuing a plan to relieve them. This question does not really come into the consideration of the propriety of the operation which Dr. Brown recommends. It is a great pleasure to me to think that here in Kentucky Dr. Brown has inaugurated a plan of treatment which has heretofore been greatly

neglected, which has met the approval of not only pathologists, but of those who have heretofore looked upon this class of cases as practically unmanageable, and I think not only the Society but the State of Kentucky should be proud of the step in advance that Dr. Brown has taken and recommended to us so boldly.

DR. JOHN A. LEWIS, Georgetown: There is just one observation I desire to make on this subject. I heartily agree with the gentlemen who have discussed the propriety of operating upon these poor unfortunate ones in our asylums; and there is no question but that these institutions contain many patients who can be operated on successfully, and ought to have had an operation done years ago. Our insane patients come from all over this broad land; from the hands of our general practitioners and specialists, and the point I make is this: In heaven's name, let us search these patients for the primary conditions or symptoms leading up to this state; search them from pillar to post before they are sent to these places; have every solitary symptom investigated before you send them there. Let us search their organs carefully for palpable disease; if we are not capable of doing it ourselves let us have specialists, and do not let us send another woman to any asylum until every means has been exhausted. When they get inside the walls of these institutions, from which, if they come back, darkened memories follow them into the grave.

DR. ARCH DIXON, Henderson: Last year, at the Shelbyville meeting of this Society, I congratulated Dr. Brown upon the fact that he was a pioneer in this work, and I wish to further congratulate him upon the excellent work he is doing. I am sure it will bear good fruit. His further report of cases shows that he is unquestionably doing good work, in that, if he has not restored these unfortunate creatures to a mentally sound condition, he has added to their comfort. If the good he has done is impressed upon other superintendents of asylums as it has been upon Dr. Stone, he will have accomplished a work of which he will be proud in the years to come. The impression at the Shelbyville meeting was that many superintendents were opposed to any operative interference in the case of the insane females, probably on account of the fact that this matter had never been brought up before; that they had never examined their patients for pelvic disease. As this matter continues to be brought forward the superintendents will have surgeons who are competent to do

this work—men who understand the diagnosis of pelvic diseases and the operations necessary for their relief. If this work is carried on in the asylums of the country, particularly those of the South, Dr. Brown will have done a work of which he will be proud hereafter.

DR. BROWN (closing the discussion): I feel very grateful to the members of the Society for the generous manner in which they have discussed my paper. There is only one point in the paper that I would explain, and that is with reference to the percentage of pelvic disease among the insane. My investigations have been very careful, and they are based on clinical experience. I do not contend that twenty-five per cent of these patients are operable cases, but I do think a large proportion of them can be improved by operation, and that the insanity of a great number of these patients is directly dependent upon diseased conditions of the uterus and its adnexa. That has been clearly proven by the results of Dr. Wylie, Dr. Rohé, and Dr. Price, as well as myself.

The first case I reported in the paper was one in which there was no hereditary history. This girl's insanity, I believe, was due entirely to a diseased condition of the tubes and ovaries. This was proven by her rapid recovery after the removal of the lesions. It has been almost a year since the operation was done. Her brother writes me that she is in perfect mental health.

In regard to the remarks of Dr. Stone, that we should not operate on a number of these cases if we think they will get well, I do not believe we have any way of telling whether they improve. I think we ought to be governed in our operative work just as if one of our patients had a fracture of the leg. If we examine a woman and find pus-tubes, they certainly ought to be removed, and in proportion as you build up her general health you give her a greater chance to recover from her mental trouble. That is all I have to say.

RADICAL CURE OF INGUINAL AND FEMORAL HERNIA.

By William L. Rodman, A. M., M. D.
Louisville, Ky.

I shall not spend any of my limited time in discussing the propriety of radical cure operations, as I consider that question settled. Five years ago there was room for honest doubts, and the writer candidly admits that he shared them, as to whether herniotomy should be done except in conditions of strangulation. New methods carried out in a thoroughly aseptic way now yield results quite as good as follow other well-established and unquestioned surgical procedures. The term "radical cure" has led many surgeons to expect permanent relief in every case operated upon, a position which is unfair and not true of other operative measures in surgery.

I shall endeavor to prove that herniotomy is less dangerous than any of the major operations, and followed by lasting results which compare favorably with the best of them. What more can be reasonably asked or expected? The question, then, is not whether we should operate at all, but when to do so, and what method to choose.

At the present day surgeons are more optimistic than they have ever been, and are doing a far greater number of herniotomies than was ever known in the world's history. The limits of the operation, therefore, are becoming enlarged rather than restricted. Cases which were formerly considered inoperable and treated by mechanical means are now promptly submitted to the knife as yielding better and

quicker results. Surgeons agree in the main as to the conditions requiring a radical operation.

First. An operation for the relief of a strangulated hernia should, whenever practicable, be supplemented by a radical cure. The latter lessens rather than increases the danger, by shutting off the peritoneal cavity from a wound which may and oftentimes does become infected. When shock is great, as a result of strangulation and the measures undertaken for its relief, it is well to postpone a radical operation until a later period, when the question can be taken up *de novo* and decided upon its merits.

Second. Irreducible herniæ so generally cause pain and gastro-intestinal symptoms, besides being more likely to be followed by obstruction, inflammation, and strangulation, that as a class they should be subjected to a radical cure. Another danger—rupture of the sac or bowel as the result of external violence—is a perpetual menace in such cases, and should be taken into consideration in deciding for or against a radical cure.

The writer has recently placed upon record an interesting case of this kind. The bowel was ruptured by a kick from a horse; an artificial anus was established spontaneously, and the patient made a satisfactory recovery.

Very large and old irreducible herniæ, where there is every reason to suspect numerous and dense adhesions, should, when occurring in elderly subjects, be let alone.

The last patient I operated upon was a man thirty-five years of age, the subject of a large irreducible hernia which began in childhood. It became strangulated. The size of the hernia, the number and denseness of the adhesions necessitated a prolonged operation. He bore it well, however, and recovered without a bad symptom.

Third. Herniæ accompanied with reducible hydrocele should be subjected to a radical cure. The cases will usually be found in early childhood, but I recently saw and operated

upon such a case in a young man twenty-two years of age living in Larue County. Trusses and injections had failed to cure both the hernia and hydrocele.

The three classes already mentioned, without there be good contra-indications, demand a radical cure.

We shall now consider what is to be done in a much larger and therefore more important class of cases, ordinary reducible herniæ. Here many things are to be considered. Age, occupation, position, general health, etc., are all important points. Children will of course be usually treated, and successfully so, by a suitable truss. I wish, however, to state that an impression more or less generally shared by the profession and by some high in authority, viz., that children under ten years of age are invariably cured by a truss, is entirely incorrect. Recent statistics taken from the largest hernia clinic known, the London Truss Society, show that, according to Macready, more than one third of such cases are uncured by mechanical means.

The results obtained at the Hospital for the Ruptured and Crippled in New York are no better, according to Dr. Coley, who is connected with this institution. Femoral hernia are infrequently cured by a truss, but, as we shall see later on, give better operative results than other forms of herniæ. Girls, of course, are more likely to be cured of inguinal hernia than boys. A truss cure of either variety of hernia in either sex after thirty years of age is accidental and not to be expected. Advanced age as a rule is a sufficient contra-indication to a radical cure, if the hernia can be reasonably well retained by means of a truss. I wish to say, however, that herniotomies in elderly subjects do better than many believe. Occupation and position in life have in my judgment much to do with a decision as to whether or not we should operate. The laboring man, accustomed to lifting heavy weights and the like, and who at the same time is either unable to provide himself with suitable trusses, or fails to do so through

indifference, is a proper subject for radical cure, and should always be so advised. The merchant or the professional man who takes no violent exercise, and who will as a rule appreciate the necessity of wearing a truss day and night, may properly decline a radical cure as long as his hernia is perfectly retained by mechanical means. If, however, he be fond of athletics, bicycling, shooting, and such out-door sports, he will act wisely in my opinion should he choose a radical operation.

Hernia unfits one for entrance into a public service, as the army and navy, and, wishing to do so, the trifling risk of a radical cure may be properly advised. Of all general contra-indications to operative measures in hernia, none are more potent than damaged kidneys. To examine the urine in every case before operating is an imperative duty.

Having briefly outlined the indications for operation, we now turn to the methods to be chosen. It is needless to say that a description of all the methods would be impracticable in a short paper. The three operations having the greatest popularity at the present time are, in the order named, (1) Bassini's; (2) Halsted's; (3) Macewen's.

Bassini's method is by far the most generally practiced, though it has been somewhat modified by different surgeons. His operation for inguinal hernia is done as follows: An incision is made parallel to and one half inch above Poupart's ligament, and should extend from the external abdominal ring to near the anterior superior spinous process of the ilium. It should embrace the tissues down to the aponeurosis of the external oblique muscle. After freeing the sac and cord from the external ring, a grooved director is inserted into the inguinal canal and the aponeurosis of the external oblique divided well up to and beyond the internal ring. The edges of the aponeurosis are dissected away from the tissues beneath in a direction above and below, above as far as the rectus, below to the deep shelving of Poupart's ligament.

This having been done and the edges held up with forceps, it now becomes necessary to isolate by a blunt dissection the sac and cord *en masse* from the surrounding tissues, then to separate them one from the other. The ease with which this step of the operation is done varies in different cases. When the cord has been carefully separated from the sac, it should be held out of the way by a hook, or better by a loop of gauze. The sac should then be ligated high up so as to bring it when amputated flush with the peritoneum. Buried interrupted sutures, usually four or five in number, are now introduced. They include the internal oblique transversalis muscle and fascia, and in some cases the rectus above, which are sewn to the deep shelving of Poupart's ligament below. In this step of his operation Bassini uses silk, but in this country kangaroo tendon is preferred, owing to the brilliant results secured by Dr. W. B. Coley, of New York, who in using it in one hundred and eighty cases secured primary union in one hundred and seventy-four of them. It certainly buries better than silk, silk-worm gut, and silver wire, and besides, is a sufficiently abiding material, requiring ninety days for its complete resorption, as shown by the experiments of Ballance and Edmunds. The next step of the operation is to place the cord in its new position and to suture the severed end of the aponeurosis of the external oblique over it with continued suture of kangaroo tendon, being careful of course not to constrict the cord. It only remains to suture the skin; no drainage should be made.

In suturing the internal oblique and transversalis to the shelving of Poupart's ligament it would not be difficult to injure the femoral vein. To remember this is the best guarantee against accident.

Dr. Dawbarn, of New York City, makes quite a material modification of Bassini's operation in transplanting the testicle from the scrotum to a point just inside the internal ring behind the peritoneum. It is quite easily done, so he tells

me, and I must say that theoretically it seems to me most worthy of a fair trial. I mean to follow his method in my next case. The cord is gently wrapped around the testicle and it is transferred to its new position. Some have suggested transplanting the testis to the abdominal cavity, but experiments on the lower animals have shown that the organ soon atrophies, due, so it is said, to the digestive action of the peritoneal fluid. The problem has ever been to get rid of the testicle and cord as factors in causing a recurrence of the hernia. It is well known that castration was frequently practiced in early operations for the radical cure of hernia, and was carried on to such an extent that it was positively forbidden by the State. If the testicle can be transplanted and its functions preserved it is certainly a "consummation most devoutly to be wished."

Halsted's Operation. This is preferred by many to the method of Bassini. The two operations differ only in two essential features; the chief difference is in the fact that Halsted removes the veins of the cord where they are in the least enlarged, which will be, according to a recent statement of his, in seventy-five per cent of all cases. In the last few days he has cautioned surgeons against the too free incision of the veins on account of the atrophy of the testicle which results in a certain percentage of cases. The next material difference consists in the cord being placed superficial to the aponeurosis of the external oblique muscle, and being covered only by the skin and cellular tissue. The suturing is done with buried silver wire. It remains to be seen whether he will have better success with the wire suture than Schede, Banks, Ball, and others, who have given it up on account of the trouble which it caused. It seems to me that the chief objection to Halsted's operation is that he does not construct a new oblique canal for the cord. Still his operation has given the most satisfactory results in his own hands, and is thought by McBurney and others to be the best we have.

Macewen's Operation, for a time the most popular of all, and even yet having its advocates, consists in invaginating the sac, plaiting it into folds, and anchoring it at the internal ring, making a living stopper as it is called. The conjoined tendon is then sewed to Poupart's ligament. The fault of this operation, as I see it, is that catgut, which is used as suture material, is not sufficiently abiding even when chromatized to insure union between muscular and tendinous structures. Substitute for the gut kangaroo tendon, and I believe that a step will have been gained.

We now come to the kernel of the subject, the danger and ultimate results of radical cure operations. Considering statistics made during the last five years only, we find an astonishingly small fatality following this operation. Bassini reports five hundred and sixty successive cases of his operation without a death; Marcy did over two hundred with no mortality; Macewen eighty-one without death; and Coley did two hundred with one death, and this due to double pneumonia on the eighth day, the result of ether.

Think of it, one thousand and forty-one radical cure operations with one death! The mortality of amputating the distal phalanx of the little finger would be as great.

To go back a little further, when asepsis was not usually so well understood and secured as now, and we find the mortality to have been rather less than one per cent in over three thousand cases reported in Marcy's magnificent work on hernia, published in 1892. These cases were collected from the practice of forty-three different surgeons all over the world. Further, nearly all of the deaths were accidental and in no way due to the wound.

Surely no one is justified in advising against an operation the mortality of which is at most one per cent, when the risks of an ordinary reducible hernia are certainly several times as great.

Do radical operations cure sufficiently often to justify the

patient in assuming the slight danger, loss of time, and expense incident thereto? Bassini reported 560 cases with 15 relapses, less than 3 per cent. Halsted 180 cases with 3 relapses, 1.6 per cent. Marcy reported 133 cases of his own which have been kept under observation, one third of them for ten years, with six relapses, or about 4.5 per cent. Coley has recently reported his results in 160 Bassini operations, and there has not been a single relapse as yet, and only six cases were untraced.

You may say that I have selected the statistics of those who have had the best results up to date. True, as I believe, in having constantly before us the highest standards in order that we may either reach or come so near to them as not to be ashamed of our own results.

My experience with radical cure operations has been rather limited, as I only began doing them twenty-eight months ago. My records show that out of thirteen radical cures all promptly recovered. Each case has been carefully followed, and there has been no relapse up to the present time. Of the series ten were inguinal and three femoral herniæ. I prefer Bassini's method, now that I understand it. My first operations were done after Kocher's plan.

Only a few words as to femoral herniæ. Practically all should be operated upon as trusses do little good, and radical cure operations are even more uniformly successful than in inguinal herniæ. High ligation of the sac is perhaps all that is necessary, as it has not been shown that sewing up the saphenous opening improves the chances of a radical cure. This is what we might expect from an anatomical standpoint. The radical cure of hernia by injections should hardly be dignified by mention of it. Still we must admit that cures are sometimes obtained by injecting hernial sacs with various substances. This plan of treatment is now happily largely relegated to quacks and empirics. That it is uncertain, painful, most dangerous and unscientific none will deny.

DISCUSSION.

DR. JOHN M. FOSTER, Richmond: About fifteen months ago it was my pleasure to be in New York City with Dr. Rodman, his business at that time being to see the Bassini operation performed. I am glad to see he has profited by that visit, and I was somewhat anticipating the remarks he made, knowing that he was interested in the Bassini operation which he has described to you, but from which you can get a better understanding from the upper drawings which you see. My individual experience is limited to eight cases; only four of these had the radical operation. They were all operated on, and the method in all of them, with one exception, was the Macewen. In one of these the return of the hernia was due to violent exercise and failure to wear a truss. The hernia is very apt to return after Macewen's operation if every precaution is not taken. In a patient, twenty-one years of age, who had strangulated hernia eighteen hours, an operation was performed, and notwithstanding the violent exercise indulged in there was no return of the trouble. It is now two years since the operation was performed. In one case in which I operated, a child fifteen months old, with congenital hernia in which the sac could not be reduced, I followed the advice of a surgeon in Louisville who is connected with one of the hospitals there, and took out an elliptical piece of the sac, then sewed up the stump, and thereby reduced the size of the sac. While it has never been my good fortune to do the Bassini operation, I feel I understand the method as well as one can who must depend upon descriptions of it, yet the hernia operation is a good deal like the operation for laceration of the perineum, in order to fully understand any particular method it is best to see the work done in all of its details. While the pathology and etiology of acute and chronic hernia are different and should be considered separately, yet it is my belief the Bassini operation is well adapted to both. Dr. Rodman made no distinction between the two, although I can readily understand there may be recent acute cases of hernia, especially in young people, where such an extensive operation is hardly called for. Then, in a country practice, where we are very much handicapped by want of proper assistants and suitable surroundings and lack of facilities, we must even decline the Bassini operation when we know it is best adapted to the case,

in order to do a more simple and less efficient one which consumes less time and requires less assistance. I hope to profit by Dr. Rodman's experience by doing the operation in suitable cases.

With regard to the subject of trusses, I should like to have heard something more from Dr. Rodman as to the best time of adjusting a truss, and I hope he will bring out this point in his closing remarks. This subject comes home to me; even in the eight operations I have alluded to I have met with some of the difficulties that I know others have experienced, and I would like to have the doctor tell us the best time for adjusting a truss after the operation, and how soon it may be applied. I would like also for him to give us an idea of the length of time consumed in the average Bassini operation as compared with other methods. I have had some bad results from failure to have trusses adjusted sufficiently early because of the efforts of the patients in coughing and straining. Those who have had experience with children under two or three years of age can appreciate what I say.

DR. GEORGE S. DAVIS, Salvisa: A word first in regard to the time of operation. I think after three years of age that an operation for radical cure should be done; that whenever we do an operation for strangulated hernia trusses as a rule are not suitable in these cases after three years of age, and the ten year limit is too great, as the doctor says.

Again, radical operation should be done in all cases of reducible hernia where a truss gives a great deal of pain, or where it is insufficient to keep up the bowel. In most cases of irreducible hernia the radical operation should be done, and a less radical operation should be performed in those cases where we have obstruction.

I will say one word in regard to femoral hernia before passing to the common form of inguinal. I wish to add a word of approval to the method where the doctor speaks of closing the wound with a flap from the tendinous muscle dissected up, at the same time dissecting up the periosteum in the horizontal ramus of the pubes, stitching both to Poupart's ligament, first having treated the sac with a puckering string with Macewen's method instead of dissecting it off.

In regard to inguinal hernia I pin my allegiance to Bassini's operation, which is the one universally recognized, as the essayist

has said, unless it be Halstead's modification. There is one addition to this to which the essayist has called attention, and that is Dawbarn's plan of closing the rings and inguinal canal by transplanting the testicle between the muscles and the peritoneum, making a bed for it, which leaves no room at this end of the bowel. This new bed for the testicle is not uncomfortable, and I will say to those who think differently that an ounce of experience in these cases is worth a pound of theory. It is as different as possible from concealing the testicle within the canal. It takes but a few minutes longer, and I would say this can be done in a few seconds longer with the finger by separating the peritoneal muscle by making a bed sufficiently large in which to drop it. In connection with Dawbarn's method of transplanting the testicle, I would advise dissecting freely the conjoined tendon of the internal oblique and transversalis muscles, so that the edges will almost lie against Poupart's ligament without sutures. This is not done very often, but by having opened the canal freely it makes Dawbarn's plan easy. I would like to add that the testicle in its new bed is just as active as it was before operation and lies surrounded by loose connective tissue, and I can conceive of no reason why it should not be active, being between the peritoneum and muscles instead of within the abdominal canal. In doing the operation all fascia should be dissected between the edges of the muscles and Poupart's ligament. By dividing the muscles and tendon and eliminating fat and fascia you have less chance of relapse.

In regard to sutures, while kangaroo tendon is an advantage, in that it is absorbed readily, still it is expensive, and silk-worm gut answers every purpose for deep sutures. For superficial sutures chromatized catgut answers the purpose well. Bassini, as you doubtless know, uses silk sutures throughout his operation, but one objection to silk is that it is difficult to sterilize.

I wish to raise one question in regard to drainage. The essayist says never use drainage. It takes but little time to insert a few strands of chromatized catgut in the lower end of the wound. If it is not needed it does no harm.

I believe the doctor gave statistics of two hundred cases without a death, and the cause of death in one case was not due to the operation *per se*, but to the anesthetic. This would seem to show that the mortality is nil in aseptic hands.

The gentleman who discussed the paper has raised the question of trusses. Recently I think the tendency is to discard trusses at the earliest moment possible, and especially if they are not particular in adjusting them. A truss adjusted too strongly is a disadvantage rather than an advantage.

DR. H. J. COWAN, Danville: We all agree that in cases of strangulated hernia, where it is possible, an operation for radical cure should be done. In cases which can not be held by trusses, which are painful and give rise to inconvenience, we should advise the performance of a radical operation; but in cases where patients are getting along well with their hernia, in which the hernia is held up reasonably well with trusses, they want to know about what chances they will have some three years after operation, and the statistics presented in the paper were a great surprise to me. I am not able to give figures, but it is my impression that the reports of operations of radical cure for hernia after a sufficient length of time following the operation are bad. For instance, I remember the last report of Halsted, in which there was a great number of relapses, and about twenty wounds suppurated in something like one hundred and fifty operations. I think probably that the difference between the proportion of bad results which I have gathered through general reading and the question of statistics reported by the essayist is, that most of those cases that have been reported are of recent date. I believe that more operations have been done in the last two years than have ever been done before. The great majority of cases reported have been under observation for two years, and in the last series of cases reported by Halsted he reports recurrences after three years. We ought not to suggest an operation to a patient who is getting along well without giving him the assurance that the statistics will be a great deal better than they are to-day, and I believe the only cases upon which we should rely are those which have been under observation for three years or longer.

DR. W. C. DUGAN, Louisville: There is one point in connection with the incision of which I desire to speak. I do not think the old idea of cutting down on the constriction and introducing the "old Cooper knife" and cutting from within out is a good one. We ought to discard that, and simply cut down, expose the ring, the constriction, and with a delicate stroke of the knife cut the constriction from without. In that way we do not

endanger the epigastric artery which the essayist has mentioned. Inguinal hernia in the female calls for an operation very early. The hernia is usually small and insignificant and calls for a small opening in operating.

I was surprised at the statement of the essayist that only one third of the cases under ten years of age were relieved by the use of trusses. Dr. Vance will speak on this point. He says he can cure nearly all of these cases, if brought to him early, by means of a truss. I do not wish to be understood as being opposed to operative interference in children. I operated a few days ago on a three weeks' old child. In these cases the social position should be considered, and some of these cases should be treated by means of a truss, provided it is not too painful.

With regard to ligation of the sac, I would go a little further than the essayist. He speaks of dissecting up the sac and cutting it off, placing it within the general peritoneum. It should be drawn down as McBurney advocates. It should be dissected away toward the ring, drawn down and cut off, so that when it is removed, instead of there being an infundibulum there will be a bulging at that point, making it much like the Macewen operation, or a modification of it.

In regard to the radical operation, the last speaker stated we could not say a patient was cured until about three years after operation. Statistics show that about 65 per cent of the cases that recur come on about the first six months; 85 per cent occur in the first year, leaving fifteen per cent that occur after that. If a patient is well at the end of the first year he has a pretty fair chance, there being only 15 per cent against him. I do not think the four-year limit should be enforced.

With regard to suture material, I prefer silk to catgut. I have had bad results following catgut, although I have taken precautions to disinfect it by means of boiling before operation. I prefer silk to silk-worm gut. The latter requires three or four knots to hold it, according to the statements of the essayist. That has not been my experience.

Now, as to the question of transplantation of the testicle. I have been advocating that for the last two or three years. I have stated before the Louisville Surgical Society that it was the future operation in all cases of this nature; and in my judgment in the very near future we will be lifting up the peritoneum and

placing the testicle along where the ovary belongs in the female. There is no reason in the world why the testicle should not have been left there—why it should be brought down in the scrotum. It is in the way, constantly being crushed, and should have been left in the abdominal cavity.

With regard to Halsted's operation, there is a decided difference in my opinion between it and that of Bassini. I am partial to the Bassini operation, and have performed it in quite a number of cases with no bad results. If we bring out the cord through the entire thickness of the abdominal wall we have a direct opening and there is no projection against it as in the Bassini operation, so that we have the hernia coming directly through. That is the objection to the Halsted or Bassini operation as it is. We have a direct inguinal hernia following here. (The point of difference between the two operations was demonstrated by Dr. Dugan by means of Dr. Rodman's illustrations.)

DR. AP MORGAN VANCE, Louisville: With regard to the question of trusses, I believe the best cures we have ever had from hernia have been from the proper adjustment of trusses. Infantile congenital cases ought to be cured by this means, if they come under our treatment early enough after birth, and just in proportion to the age thereafter is the possibility of effecting a cure. Time and again I have cured young adults by trusses. I have a case in mind now of inguinal scrotal hernia that I treated during the last two years with a perfect result. The patient had only worn a truss for nine months. A good deal depends upon the intelligent application of the truss, and the proper conduct of it afterward. The patient should be taught what is to be expected of a truss, and should be seen often by the surgeon so as to keep up the treatment properly. I believe that no child ought to be subjected to the radical operation except where there is a tendency to incarceration or strangulation until the truss has been faithfully tried and for a continued length of time. I believe from early infancy up to the time of two years that a soft truss, made of cotton flannel, and the mother taught how to use it and cleanse it when soiled, is one of the best things we can use for the cure of hernia. All trusses that constrict the body and press upon the canal are faulty and do harm. They keep up a constant movement there. The truss should be in constant and unchanged relation to the part.

DR. H. H. GRANT, Louisville: This subject is an exceedingly important one. Hernia is such a common affection that a very large proportion of the population in the country are more or less interested in what is to be done for it. If there was an illustration presented to this Society this morning to show the invalidity or unreliability of statistics, it would be the statements made to you by Dr. Vance, a gentleman who is an authority on the subject of trusses. Every other speaker has indicated his want of confidence in the use of them, and a great many believe that statistics can be adduced to prove that trusses are of no value and that relief is not obtained; yet here is an authority who declares to you that he has succeeded in a number of instances, not only in children but in adults, in accomplishing a radical cure. It is merely an illustration of the fact that in the opinion of certain individuals certain measures accomplish satisfactory results which in the hands of other individuals utterly fail of any thing like success. This subject is too important for theory to guide us instead of practice, and this theory, based largely upon statistics, leads us I think into errors oftentimes. It is the experience of nearly every surgeon with whom I am acquainted, not only in Louisville but in other cities, that the term uninterrupted recovery means a different thing from an absolutely uneventful convalescence. It has been my experience in operations, both for strangulated hernia and in conditions in which the bowel was not strangulated, to have more or less trouble in the recovery of the patient. Even though I might think he had a practically uninterrupted recovery, still septic infection of not only the wound but of the mesentery occurs in the hands of the ablest surgeons. Within the last few months a paper has been written by Dr. Bull, of New York City, in which he reports a number of instances of infection of the omentum by the ligature. I have had two surgeons in Louisville tell me that the same accident has happened to them. All of these patients are regarded as having got well from the operation, but in many instances they have been subjected to a long and painful convalescence, with more or less localized peritonitis, with perhaps a discharge of pus. If we recommend to them without hesitation an operation for the radical cure, based upon the the statistics that have been presented to you by the essayist, and the patients have only accepted the operation because of the

rosy color we put upon it, and then an unfortunate result follows, or a tedious recovery obtains, we are very likely not only to get some reproach from the patient and family, but to feel that we ourselves have done unjustifiable damage. Therefore I would suggest, in the consideration of this subject, that we look at it from a practical rather than a theoretical standpoint, and the prognosis should be looked upon as depending upon a considerable variety of conditions, and we should not be satisfied with any thing short of actual recovery. It occurs to me that there are certain conditions in which the operation for radical cure is to be done without hesitation. In some cases of strangulated hernia the patient is not in a condition to submit to any thing like a prolonged operation. Occasionally, after strangulated hernia, the patient is usually so depressed constitutionally as to render it unwise to subject him to long operative measures. But where he can bear it the operation should be done. In case of irreducible hernia the patient is subjected to the dangers of strangulation, which is infinitely more grave than the operation itself. An operation in these cases should only be done when the patient applies for it, or after the risks and dangers have been laid before him and he accepts and even insists upon it being done. Those persons who are comfortable in wearing a truss, who have had no difficulty with it, who have not subjected themselves to an expert to cure them without an operation, should not be encouraged to undergo an operation unless there is some special reason for it, as going on a long journey, or their avocation is such as to expose them to risk. Aside from this I question whether it is just to recommend to the profession or laity that this operation should be done without careful consideration of all of its risks.

With respect to the transplantation of the testicle, it appears to me that the statements made by Dr. Dugan, who is in every respect competent to express an opinion upon both the anatomical and surgical parts of the subject, are not safe ones at the present day to recommend to the general public. Oftentimes an individual subjected to treatment of this kind, and perhaps safely and comfortably recovers, would reproach his surgeon, and in many instances the patient might suffer from serious depression because of the changed condition in his anatomy. It is occasionally necessary, it is perhaps often expedient; but in any thing

like general practice it occurs to me it would be exceedingly unwise. It is only these two or three points that occurred to me as being worth while to present my views upon, as I have always looked upon conservative surgery as being simply a question for the welfare of the individual, but it should never be so limited as to interfere with the radical nature of an operation that is demanded by the condition. The surgeon should never be so rash as to rush boldly into an operation for the sake of doing it or of obtaining the reward that results from it.

DR. RODMAN (closing the discussion): Dr. Dugan has answered the first question asked by Dr. Foster, as to when to apply trusses after operation. I will say Dr. Kelly and most operators who are doing a great deal of work in this line do not use trusses at all after operation. I think myself that it is not a bad plan to use a light form of truss in the case of a man who has a good deal of heavy work to do. A good deal will depend upon the length of time the patient is kept in bed. Some are kept there for two weeks and use trusses after this; others are kept there six weeks. There is a difference of opinion on this question, but in general the tendency is to do away with trusses after the operation.

As to the radical cure for femoral hernia, while a great many operations have been done it has not been shown that they really improve the chances for radical cure. High ligation of the sac, then doing as I emphasized in my paper, was referred to by Dr. Dugan, and I will say it is my custom not only to ligate as high up as possible, but to even twist the sac. In that way we avoid the infundibulum in the internal ring.

Dr. Davis spoke of the use of silk-worm gut as a substitute for kangaroo tendon. Bassini uses silk altogether; he never uses tendon. The use of the latter seems to be largely an American practice. In the country tendon can not be had.

Dr. Cowan has seen some of Halsted's old statistics. Only last week, in a discussion in New York at the meeting of the American Surgical Association, he was speaking on the subject of hernia. He reported 180 cases with 3 relapses, which would be 1.6 per cent. That was the most recent expression from him. As Dr. Dugan has said, Dr. Kelly has decided that question to the satisfaction of all, namely, that 85 per cent of all cases which recover do so within a year. If a patient passes a year the

chances are he will remain cured, though some of course do remarkably well for five, ten, or twenty-five years. Dr. Cowan spoke of the great number of relapses following the radical cure operation. I took the position in my paper that we should follow our work for the last four or five years. It is well known that there were fifty per cent of recurrences following McBurney's operation, and it has been abandoned not only by operators in general but by McBurney himself. McBurney admitted in the discussion that the operation was not a good one, and he preferred Halsted's method to any other. Bull, who was pessimistic in 1890, is now optimistic, and is doing to-day more herniotomies than any man in America. I saw him (while I was in New York) do two herniotomies.

Dr. Dugan misunderstood me in regard to the number of children not cured. I said one third were uncured by trusses. Dr. Vance has treated that subject in a fair and scientific way, and his remarks are borne out by statistics. McCready has written a magnificent work on the subject of hernia; his results are drawn from the largest hernia clinic in the world, the London Truss Society. Children under one to two years of age are practically cured by trusses, but taking all children under ten years of age and 33 per cent remain uncured by mechanical means. If you can get the little children early, with intelligent mothers to watch the little fellows all the time, you will cure the vast majority of cases of inguinal hernia. McCready speaks pessimistically of femoral hernias, because practically none of them get well. I would like Dr. Vance to have spoken on this subject.

I am very glad to state here that Dr. Dugan practically advocated the same operation that goes by the name of Dawbarn in the Louisville Surgical Society. I am inclined to believe that it is to be the operation of the future, because when we know we can get rid of the testicle and cord as factors, we are certainly more likely to get better results. The older operators of the seventeenth century had the best results in operating for the radical cure of hernia, but they did it by castrating the patient, and performed the operation to such an extent that it was positively forbidden.

MODERN METHODS OF INTESTINAL ANASTOMOSIS.

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If the direct results of all of Professor Senn's labors were to be proven erroneous he would, by the matchless impression which his efforts have indirectly created, nevertheless stand as one of the most forcible figures in the surgery of the nineteenth century. Indirectly these efforts are more responsible than those of any other single surgeon, or perhaps a number of surgeons, for the establishment of one of the most brilliant schools known in the entire history of surgery. Many valuable and ingenious suggestions, ideas, and devices have been given us by others, and since the time of Senn's first labors in this direction; but who can prove that in the absence of Senn we would still have made the same rapid advances which we have made and which we believe to be due to that fruitful tide which has been created and kept alive by the energies of this surgeon.

Viewing the question of intestinal surgery from a general standpoint we see an almost equal division, with one side in favor of devices of one variety or another, and the other side in favor of methods involving the suture alone. In America there seems to be a predominating influence in favor of some character of device, while among the European surgeons many brilliant efforts have been made in behalf of the suture *per se*. As to which will gain the final supremacy, or as to whether there ever will be such a condition as a final supremacy, it is difficult to foretell; but, speaking in general, we can not deny that, all things being equal, we

must consider the suture as the more surgical method of the two. To illustrate further, if we were to select two methods of known and equal safety, the one involving the suture alone, and the other involving the device alone, we can not help but admit that in the one which involves the suture only the surgeon is the complete master of the situation, fulfilling practically to the end the whole object of the method and assuming the responsibility of the final result, while in many of the devices the most important feature of the method is carried out by the chosen device, thereby becoming, so to speak, the chief factor in the method and assuming the major portion of the shifted responsibility.

The truth is, that in order to intelligently understand one another and to thoroughly appreciate the details of this important question we must divide the cases requiring intestinal interference into two classes, namely, the *planned* and *emergency* class. In the planned cases we presume to know before the operation is begun the tolerance of the subject and about the character of the interference. While our aim is not only to save life, which it is unnecessary to say is at all times and under all circumstances the chief and sole aim of the surgeon, but we desire to save life with the best subsequent result. In emergency cases the condition of affairs may compel the surgeon to select methods which have as their sole aim the bridging of the subject over the impending crisis without any special reference to the subsequent condition. In short, measures which would be thoroughly undesirable in the planned case may become eminently justifiable in an emergency case. Present indications point to the fact that the time is not far distant when we will be able to operate upon all the planned cases by the suture alone, and that the devices will practically be relegated to those cases of an emergency character.

The chief advantage which the devices have over the suture is the saving of time. That this is a considerable

advantage no one will deny, but we believe that the saving of fifteen or twenty minutes does not always justify us in closing our eyes to the sutures and to select an otherwise inferior method. In fact, as it has already been pointed out by others, the saving of this time does not in many cases make any material difference.

Another argument that we frequently hear during discussions on this subject, is that sutures would be justifiable in the hands of certain operators and equally unjustifiable in the hands of others. Surely this can not be considered in any but the light of a very lame argument. While every one must admit that all can not possess the same standard of operative skill, yet still every one who pretends to perform intestinal operations should possess at least the necessary skill to satisfactorily carry out such measures which the exigencies of the case demand, whether it be suture or device. Mr. Maunsell is quite right when he refers to our training as being too much of a "bookish" nature. We are too anxious to learn the art of surgery from a well-written piece of paper instead of from an actual manual training. We are too ready to consider as beneath our dignity a few lessons which a first-class tailor might probably give us in the art of sewing.

The success of Lawson Tait—who, according to his own confession, has served his apprenticeship at the lathe, the bench, and the forge—no doubt is largely dependent upon his remarkable operative skill. The art of surgery can be elevated to a degree of perfection only by careful cultivation in its fundamental principles, and cultivation which should never have its commencement upon such precious material as the human subject.

Apart from all this, however, it must be apparent to even a casual observer that *hard* and *fast* lines governing every case can never be laid down, and that after all every case must more or less be a law unto itself, and the key to the success-

ful management of any of the cases depends upon the correctness of the operator's judgment and the perfection of his operative skill.

Next to the question of deciding between the use of the suture or the mechanical device is that of selecting the lateral or the end-to-end method of establishing the intestinal continuity. In many cases the choice of method is out of question, but where the conditions tolerate a preference it should always be given to the end-to-end method as the most natural way of establishing the communication. Not alone is this the most natural way, but by this method there is practically no subsequent contraction, which always occurs by the lateral method, as is illustrated by the following cases reported by Abbe:

"Three of the author's (Abbe) cases of lateral anastomosis illustrate the subject admirably. In the first, done in 1888, between the ascending and transverse colon, Senn's plates were used—the patient dying six months after operation. The aperture, which was one inch and a half in length, had contracted to three fourths of an inch, and was sufficient for its purposes only when laxative medicine was constantly given. In the second case, the patient dying six months after anastomosis with catgut rings, the opening had contracted from one inch and a half down to half an inch. In the third case, eight months after lateral anastomosis of the sigmoid by suturing, the aperture contracted from three inches to one and a half. This was perfectly competent to do the functional work of the bowel." (Annals of Surgery, vol. 15, p. 391.)

In a number of resections, some of which were performed in connection with this paper, but most of which were made about two years ago, there was a turning in of enough of the intestinal wall as to almost create a perfect diaphragm, and at the end of several months there was but the slightest amount of annular constriction remaining, while, if but a

small amount of the intestinal wall is inverted, the seat of operation can in many instances never be made out.

Where lateral anastomosis is indicated time can often be saved by the use of mechanical devices, such as the clamp devised by Dr. H. H. Grant.

FIG. 1.—Showing the absence of the serous covering at mesenteric border of the intestine.

The distribution of blood and the arrangement of the serous covering of the gastro-intestinal tract, while known to every medical individual, have hardly been presented with the emphasis with which they deserve. The blood-vessels, as we all know, practically take their origin from the curvatures of the stomach in supplying that organ with blood. From the curvatures the vessels space off toward a point midway between these two borders, leaving a strip devoid of any vessels which are likely to cause any troublesome hemorrhage. When possible the operative measures should always be carried out as near as permissible to this point. In the intestine the corresponding point is located just opposite the mesenteric attachment, and should for this as well as any other reason, when allowable, be given the preference in all operative interference.

To thoroughly understand the arrangement of the serous covering of the intestines we have but to throw a bandage over some cylindrical body, drawing the two overhanging ends fairly taut. By this means will readily be seen a tri-

angle, the walls of which are formed by the bandage, and the base being occupied by the lower border of the cylinder. It will be noticed that this narrow strip of the intestinal wall is partially devoid of serous covering and that the triangle is occupied by connective tissue and important vessels which parallel the intestine. In all operative measures this portion of the intestine should be given a wide berth; and, should any interference with this part of the intestine become necessary, it should always receive the most watchful attention that its closure becomes perfect and that no unnecessary disturbance with its blood-vessels may occur.

The present condition of intestinal surgery has reached such a standard as to demand something more than mere novelty from any new method, and those which now occupy the surgical world can be conveniently arranged as follows:

1. *Mechanical Devices.* (*a*) Dawbarn's Potato Plates; (*b*) Abbe's Catgut Rings; (*c*) Senn's Decalcified Plates; (*d*) Von Baracz's Turnip Plates; (*e*) Murphy's Button.

2. *Sutures.* (*a*) Woelfler's Method; (*b*) Maunsell's Method; (*c*) Jessett's Method; (*d*) Paul's Method.

To go into details with any of the above methods is not only unnessary but would occupy more time and space than would be expected. In fact, we almost believe that the sutures alone require any special attention so far as any description is concerned, since the others have already received sufficient attention in the pages of current literature to make any further descriptive remarks nnecessary.

The chief objections that have been raised against the Senn plates and Abbe rings are that often they are difficult to obtain or prepare, and in their safety are hardly superior to the plates prepared of potatoes or turnips.

Against the plates prepared of potatoes or turnips have been urged the objections that they are large and somewhat clumsy, and by their size they excite peristalsis and produce, as has been said, "a tugging at the wound." The advantage

of these plates, however, can readily be seen. They are easily prepared and from material that is readily obtainable, besides being absorbable in their nature.

The latest and one of the most brilliant of the devices that have been offered is the button devised by Dr. J. B. Murphy, of Chicago. While the button has passed through a most brilliant probationary period of existence, its final scope of usefulness yet remains to be outlined. So far the objections which have been urged against the button are:

1. The contraction of the opening, especially in a side-to-side anastomosis.

2. The button acting injuriously by assuming the rôle of a foreign body.

3. The possibility of the button causing trouble by becoming arrested at the ileo-cecal valve.

4. The chances of the button dropping in the wrong direction, that is, into the stomach in a gastro-enterostomy, or into the isolated loop of the intestine in an intestinal anastomosis.

5. The possibility of the button not disengaging itself or of becoming arrested in some part of the intestinal tract.

6. "It makes the patient dependent upon the craft of the cutler rather than the skill of the surgeon."

7. The chances of the necessary pressure atrophy in failing to liberate the button.

The arguments for and against the first six of these objections have been reviewed in a paper read before the Louisville Academy of Medicine in the beginning of the year, and were published in the May number of the Medico-Surgical Bulletin. As for the seventh objection, we have not been able to learn of any case in which the pressure atrophy failed to liberate the button; but this did occur in an experimental operation in which the button was used in performing a cholecyst-duodenostomy. This operation was performed in February, and the dog was sacrificed in June. Upon examination the button

was still firmly enclosed in its original position, but presented a very corroded appearance. While, as we have said, it is impossible to establish the limit of usefulness to which the button may be subjected, there are at least two operations that seem particularly adapted for its use, that is, cholecyst-duodenostomy and end-to-end anastomosis. In the lateral anastomosis the opening which even the oblong button can supply is rather small when we consider the subsequent contraction which follows this operation.

"*Gastro-pylorectomy.* (Maunsell.) If the disease is confined to a very small portion of the pyloric end of the stomach, it may be excised completely.

"On account of the abnormal semi-fixed condition of the greater portion of the duodenum, the application of this

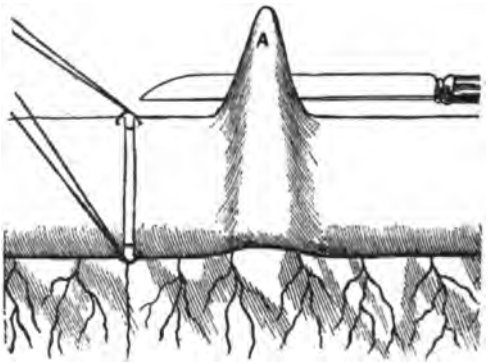

FIG. 6.—*Circular Enterorrhaphy.* Longitudinal section (about an inch and a half long) with tenotomy knife, of that portion of the larger segment of gut which is opposite to its mesenteric attachment. This opening should be made about an inch from the severed end of the larger segment of the bowel; its length depends on the size of the gut to be invaginated. In performing this part of the operation, pinch up the coats of the intestine between the finger and the thumb, and divide with a tenotomy knife or a pair of scissors.

operation is limited to cases where there is only a small amount of disease confined to the pyloric end of the stomach.

"When there is extensive disease confined to the pyloric end of the stomach and the upper portion of the duodenum,

it may be deemed prudent for many reasons not to attempt the removal of the mass.

"Under these conditions gastro-jejunostomy or gastro-intestinal anastomosis may be performed in the following manner:

"1. Draw out a portion of the jejunum as close as possible to the duodenum, empty it of its contents by gently squeezing it, and apply the sponge clamps in the usual manner.

"2. Gently draw the greater curvature of the stomach into the wound.

"3. Place the jejunum along the greater curvature of the stomach and proceed to unite them in whatever position they lie naturally, with least strain or kink.

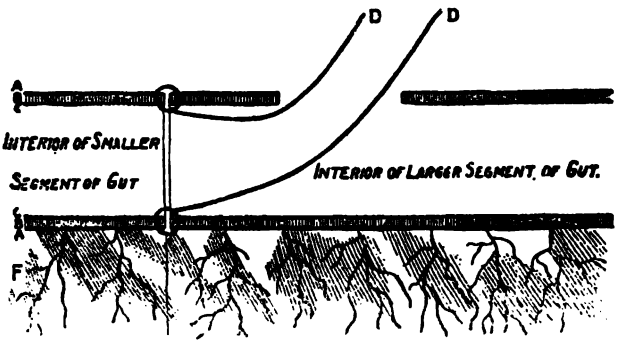

FIG. 7.—*Circular Enterorrhaphy.* Longitudinal section of gut showing: *AA.* Peritoneal coat; *BB.* Muscular coat; *CC.* Mucous coat; *DD.* Temporary sutures passed into the bowel, and out through the longitudinal slit made in larger segment of gut; *F.* Mesentery.

"4. The opening in the longitudinal axis of the jejunum should be slightly over an inch long and in that portion of the gut most distant from the mesentery. The corresponding opening in the stomach should be in the line of its greater curvature and one inch above it.

"5. Unite the corresponding extreme ends of the wounds in the jejunum and stomach with temporary sutures passed through the entire thickness of the walls of the stomach and

jejunum, leaving the ends of the sutures long. Make an opening in the center of the stomach sufficiently long to permit the easy invagination of the corresponding openings in the stomach and jejunum.

"6. Having invaginated the two openings, sew them up all around as previously described, passing the needle through all the coats of the intestine and stomach.

"7. Now retract the firmly approximated openings to their normal positions and sew up the longitudinal slit in the stomach with a continuous suture passed through its peritoneal and muscular coats.

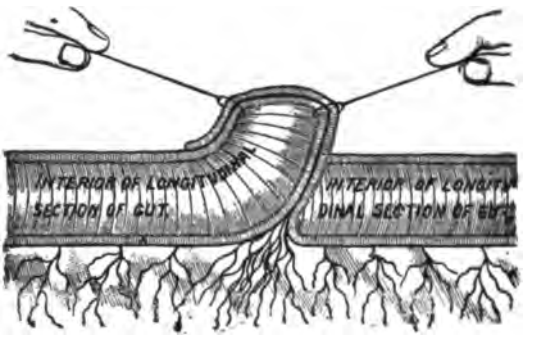

FIG. 8.—*Circular Enterorrhaphy.* Longitudinal section of intestine, showing the relative position of the different layers of the bowel invaginated at the longitudinal slit.

"Withdraw invagination and sew up the slit in the center of the stomach with a continuous suture.

"*Ileo-colostomy.* If the diseased cecum, ileo-cecal valve, and appendix can not be safely excised owing to old-standing recurrent inflammation having firmly matted the bowel to the right ureter and the iliac vessels (as I have seen on several occasions), perform ileo-colostomy:

"1. Empty the diseased cecum and colon end of ileum.

"2. Apply the sponge clamps to the healthy ileum and colon four inches off the disease.

"3. Invaginate the cut end of the ileum attached to the cecum and sew it up with a continuous suture.

"4. Make a slit on the convex surface of the colon sufficiently long to just receive with very slight constriction the cut end of the ileum; secure with two temporary sutures, leaving the ends long.

"5. Make a slit in the colon an inch higher up or an inch lower down in the cecum, whichever is most convenient for the invagination.

"6. Pass a dressing forceps through the slit and seize the two ends of the temporary sutures.

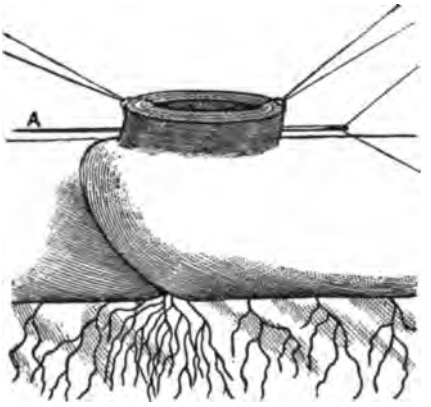

FIG. 9.—*Circular Enterorrhaphy.* Invaginated gut, showing the two peritoneal surfaces in juxtaposition all around. *A.* Needle passed through both sides of the bowel, including all the coats—introducing two sutures with one passage of the needle.

"7. Drag the invaginated cut end of the ileum and its corresponding opening in the colon out through the slit.

"8. Suture carefully all around and pull back to its normal position.

"9. Sew up the longitudinal slit with a continuous suture.

"Clamp the ileum and colon; completely excise the diseased cecum and appendix.

"Insert the cut end of the ileum into the healthy colon two inches above its cut end. Apply the two temporary sutures and invaginate them through the cut end of the colon; sew up all around; withdraw the invagination. Finally close the cut end of the colon with a continuous suture, having invaginated it within itself to the extent of an inch.

"*Ileo-sigmoidostomy.* This operation may be performed where the seat of obstruction is located low down in the colon near the sigmoid flexure. An artificial anus leaves a man in a loathsome condition, and should only be made in

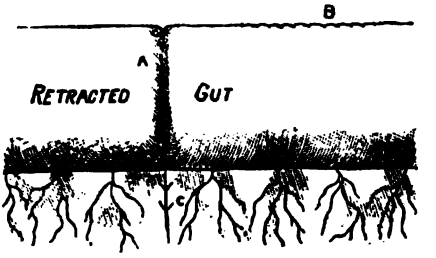

FIG. 10.—*Circular Enterorrhaphy. A.* Line marking junction of both ends of bowel, the peritoneum well turned in, and the sutures and knots all inside the gut, making an almost invisible air- and water-tight joint; *B.* Longitudinal slit in bowel, sewn up with continuous suture; *C.* Sutures in the mesentery, seldom necessary to put more than one or two.

cases of obstruction from disease below the sigmoid flexure of the colon." (American Journal of Medical Sciences, vol. 103, p. 245.)

In describing Jessett's operation I take the liberty of borrowing the author's description as given in his article upon ileo-colostomy and gastro-enterostomy respectively in the Lancet, February 14, 1891, and October 14, 1891. In his description of the ileo-colostomy he remarks:

On August 3d, with the assistance of Dr. Hayes and Dr. Purcell, Dr. English giving the anesthetic, I opened the abdomen by an incision about three inches long over the right linea semi-

lunaris, all bleeding points being caught with pressure forceps. I opened the peritoneum along the whole length of the incision, and immediately came down upon a large mass of disease extending from the cecum nearly as high as the transverse colon. It being quite impossible to remove this, I determined to divide the ileum and implant the proximal end into the transverse colon. Passing the index finger of the left hand along the inner side of the cecum, a portion of ileum close to the ileo-cecal valve was easily drawn out of the wound. I then passed two pieces of india-rubber cord lightly around the intestine, about four inches apart, the piece on the distal end being placed about two inches from the ileo-cecal valve. I next divided the intestines completely across between the two india-rubber ligatures, caught up and ligatured all bleeding points and washed the

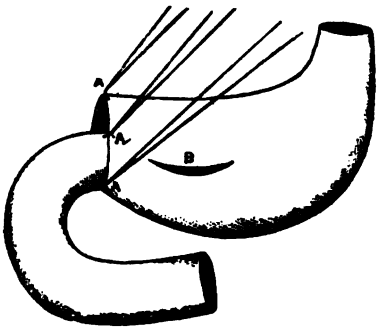

FIG. 11.—*AAA.* Temporary sutures with ends intact, uniting cut surfaces of stomach and pylorus; *B.* Longitudinal slit in stomach, made by pinching up its coats between the finger and thumb, and transfixing with a tenotomy knife. Through this opening the invaginated cut ends of the pylorus and stomach are passed, when they can be sewn up from the inside and then retracted to their normal position, the longitudinal slit being sewn up with a continuous suture. (Maunsell.)

divided ends thoroughly. The cut end of the distal part of the ileum was inverted and closed by stitching together the peritoneal covering with a fine silk suture.

The next step in the operation was to line the proximal end of the divided intestine with a thin band of india rubber, about half an inch wide, which was fastened by a continuous catgut suture to its cut edge. Two chromatized catgut sutures, about eighteen to twenty-four inches long and armed at each end with

a needle, were next passed through the india-rubber band and all the coats of the intestine from within outward. The posterior threads were passed one on either side of the mesentery, and the anterior threads at equal distances apart through the convex surface of the bowel. A portion of the transverse colon was next brought out of the parietal wound and a longitudinal incision made in its convex surface. The long sutures connected with the ileum were then passed through the serous and muscular coats of the colon, the anterior threads about half an inch apart at the end of the opening in the colon, and the posterior threads at a similar distance at the other end. The open end of the ileum was then thrust through the slit and the sutures firmly tied, thus preventing the possibility of the bowel

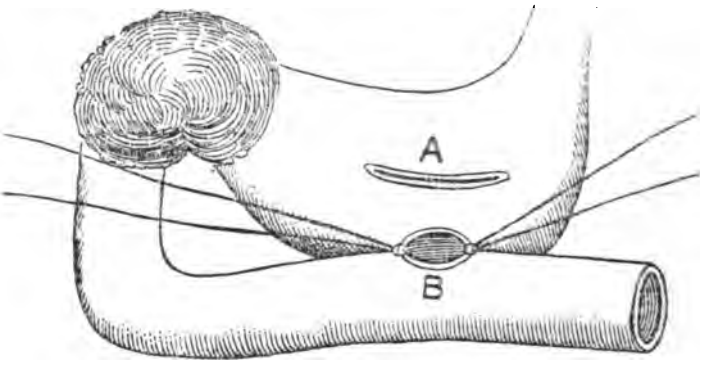

FIG. 12.—A large cancerous mass involving the pyloric end of the stomach and the upper part of the abdomen. *A*. Opening in the center of the stomach (where the vessels are very small) through which the corresponding openings (united by temporary sutures, *B*), made in the longitudinal axis of the upper end of the jejunum and in the line of the greater curvature of the stomach, may be invaginated and sutured round in the usual manner from the inside. (Maunsell.)

slipping out; two Czerny-Lembert sutures, one on each side, were introduced, passing through the serous and muscular coats of the colon and small intestine, and tied firmly. An omental flap was finally fastened round. The parts were thoroughly cleansed and dropped back into the abdomen and the parietal wound closed and dressed in the usual way. The operation lasted about one hour.

The patient stood the operation very well, and was returned to bed and ordered to be fed with nutritive enemata and zyminized meat suppositories for the first twenty-four hours.

August 4th. Motion passed naturally by the rectum to-day, and continued to do so daily. No tenderness over the abdomen, excepting over the original tumor, the outer and lower side of which is brawny, and had all the appearance of deeply seated cellulitis.

August 5th. I visited the patient with Dr. Hayes, and found the bowels had acted naturally and well and the wound looked

FIG. 13.—Jessett's Ileo-colostomy.

healthy. A large abscess was pointing at the upper part of the thigh; this was freely opened, letting out a large quantity of stinking pus; this was kept syringed out and drained. The patient takes his nourishment well, and is kept up with brandy, champagne, beef tea, etc. The patient had not sufficient vital power left to resist the constant drain of the abscess, and died on August 16th, thirteen days after the operation.

Remarks: Had this patient been operated on earlier I am convinced that his life might have been materially prolonged. So far as the operation was concerned it was all that could have been desired. There was no peritonitis, and feces passed freely

from the day of the operation until his death, nearly a fortnight after. This being the case, this operation must commend itself to all surgeons as being far preferable to any operation which has for its aim merely the formation of an artificial anus or a fecal fistula. In my experimental research, published in July, 1889, I had not one death after the operation I have described.

The details of his gastro-enterostomy, given in his own language, are as follows:

Operation, August 4th. Two hot-water cushions being placed on the table and covered with warm blankets, and the patient being placed thereon, Dr. English proceeded to administer ether,

FIG. 14.—Jessett's Ileo-colostomy.

and Mr. Elam kindly assisted me in the operation. An incision three inches long was made in the middle line from the umbilicus upward through the abdominal parietes, which were so very thin that the peritoneum was cut down upon directly, and no bleeding points required catching. The peritoneum was divided the whole length of the parietal incision and caught in three places on each side with pressure forceps. The tumor in the pylorus was seized and readily brought out through the wound. It being found to be perfectly free from all surrounding organs I determined to remove it. A cloth wrung out in warm carbolized water was packed around the growth, which was found to extend for about four or five inches along the walls of the stomach. I next, with an aneurism needle armed with a No. 1 chromic gut, ligatured the vessels running along the larger and smaller curvature of the stomach, a little to the left of the point

at which I proceeded to make the section, and with a pair of broad ligament forceps I clamped that portion of stomach on the duodenal side of the proposed section. I then tore through with my finger the lesser omentum, and, Mr. Elam firmly holding the stomach, I proceeded to cut it across between his finger and the clamp forceps with scissors, catching up each bleeding point as it was divided with the pressure forceps. The growth with the pylorus being thus severed from the stomach was allowed to hang loosely out of the wound, covered with a cloth soaked with warm carbolized water. The vessels in the divided edges of the stomach were now quickly ligatured with catgut, and, as it was found that there was a quantity of fluid in the stomach, this was carefully siphoned off by means of a rubber stomach-tube and washed out. The edges of the stomach

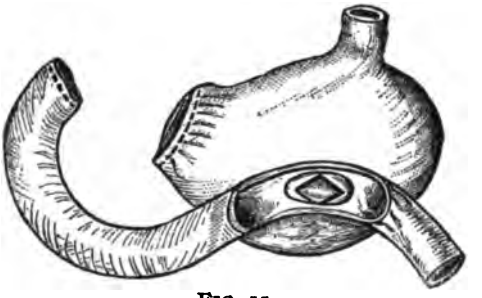

FIG. 15.

were next united by means of a continuous chromatized catgut suture passing through all its coats. A second line of quilt sutures of No. 1 chromatized gut were now passed through the serous and muscular coats about an eighth of an inch from the edges; the ends of each pair of these sutures when passed were secured by clamp forceps, to allow of all the sutures being inserted before tying. Nine of these sutures were introduced in all; as each of these were tied care was taken to thoroughly invert the cut edges of the stomach so as to assure a good surface of peritoneum being approximated. When all these sutures were tied and the union appeared complete, I allowed the stomach to drop back into the abdomen. I next passed an india-rubber ligature lightly round the duodenum about two inches from the pylorus, and clamped that portion of the duodenum close to the pyloric orifice with the forceps, and divided it between the

forceps and the elastic ligature, leaving as much of the duodenum as I could with safety. The pylorus and growth were now free excepting at their attachment to the great omentum. This I transfixed with No. 4 Chinese silk and ligatured in the same manner as an ovarian pedicle (Fig. 4), and removed the growth by cutting the omental attachment across with scissors. The

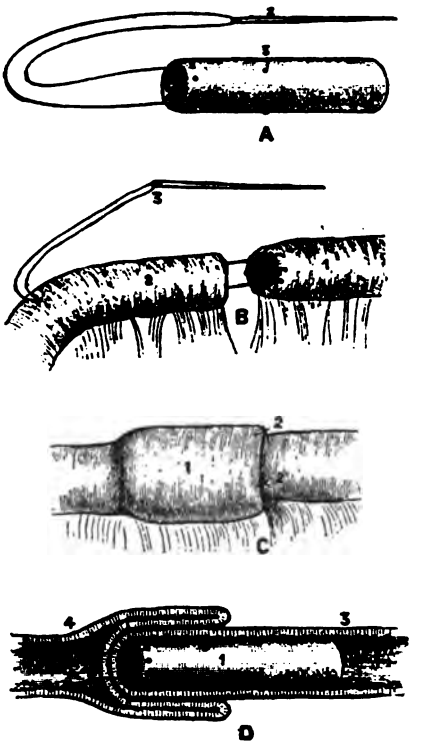

FIG. 16.

divided end of the duodenum was then united by means of a continuous chromatized catgut suture passing through all its coats and a second row of quilt sutures of No. 1 chromatized gut, in the same manner as that described for the union of the divided end of the stomach, and allowed to drop back. The rubber ligature was now removed from the duodenum, a sponge was introduced into the cavity, and the first part of the operation thus completed.

I then proceeded to perform gastro-enterostomy. I first pushed the transverse colon and omentum over to the right and passed the index finger of my right hand over it, and caught up a loop of the jejunum close to its origin and drew it out through the wound. The stomach was again withdrawn and an opening made into it about an inch and a half long, parallel to and about an inch from the parallel curvature and two inches from the divided end. A decalcified bone plate, threaded with two lateral chromatized catgut ligatures and two longitudinal No. 1 silk ligatures, was introduced. The lateral ligatures were passed through all its coats about an eighth of an inch from the divided edge. The ligatures were given to an assistant to hold, while I proceeded to introduce a similar bone plate into the jejunum. Before doing this two india-rubber ligatures were passed round the intestine almost four inches apart and fastened lightly. An opening in a longitudinal direction, about an inch and a half in length, was made in the convex surface of the jejunum between the india-rubber ligatures, and a bone plate introduced, the lateral catgut sutures being passed through all the coats of the bowel. The two plates were now held in accurate apposition by Mr. Elam, while I tied the corresponding ligatures of the two plates. In tying the upper lateral ligature a considerable portion of mucous membrane prolapsed and was with difficulty got into place, so I cut it off with scissors, after which the upper edge was readily made to go into its proper position. (Fig. 5.) A row of quilt sutures, five in all, were introduced along the upper edges and ends of the plate, and the parts, being thoroughly cleansed, were dropped back. The sponge which had been placed at the cavity left by the resection of the pylorus was removed, and, all being dry, the abdominal wound was closed with silk-worm gut sutures in the usual manner, the wound dressed with sublimate gauze, and a large pad of wool and a many-tailed bandage firmly applied. The patient was then returned to bed.

The patient bore the operation exceedingly well; the only time that her condition appeared to give anxiety was after the division of the stomach and stitching up the duodenal opening. During the latter part of the operation she rallied a great deal. The operation lasted one hour and forty minutes. The portion of stomach and pylorus removed measured about six inches in length and four inches from above downward at the gastric end. The specimen was shown at the Clinical Society with the patient. It contained a mass of growth which was firm and not

ulcerated, and which almost completely obstructed the orifice of the pylorus. There were no adhesions. The patient made a good recovery.

Paul describes his method as follows:

The bowel being ready to receive the tube, its full length is introduced into the proximal end, the cut margin of which is sewn to the tube through the perforations with a fine, continuous chromic gut suture (*B*). For this purpose a sewing-needle is used, which, in passing, is made to dip more deeply into the mucous than the peritoneal coat. It is not sufficient to take the muscular and mucous coats only, as the attachment to the tube is then not sufficiently secure. When sewing the mesenteric border of the bowel to the tube care should be taken to pick up the severed edges of the mesentery with the point of the needle, as this is the point most likely to give way, and the mesentery should not be allowed to drag in the least degree from the cut edge of the bowel. Next the needle of the traction thread is slipped along a director about three inches down the distal segment of the bowel and pushed through its wall. Then the distal is sewn to the proximal end by a chromic gut suture all around, the needle piercing the musculo-serous coats only, great care again being taken to fix the mesenteric edge securely. With the same thread the opening in the mesentery can be drawn together. Now an assistant takes the traction threads and steadily resists the operator as he draws the distal end of the bowel back over the tube, thus invaginating the proximal end and producing the appearance seen in the engraving (*C*). The parts are retained in position by a few Lembert sutures, one on either side of the mesentery, and others as they appear necessary. Lastly, the traction sutures are cut off and the openings closed with Lembert stitches. For the human bowel I have had made tubes one and one half inches long, with diameters varying from one half inch to three fourths inch and one fourth inch in thickness. (London Lancet, May 30, 1891.)

In closing I beg leave to submit for further consideration the following conclusions:

1. The highest degree of vascularity in the intestine is in the region of its mesenteric border, and the lowest degree is at a point just opposite the mesenteric border.

2. The highest degree of vascularity in the stomach is along its curvatures, and the lowest degree is at a point midway between its curvatures. Throughout the entire intestinal tract there is an absence of the serous coat at the mesenteric border.

3. In view of the diminished vascularity and the constant presence of the serosa at a point midway between the curvatures in the stomach and opposite the mesenteric border in the intestines, these regions should be regarded as *the lines of safety*, and when permissible should always be given the preference in all operative measures.

4. The dangers of sepsis, hemorrhage, peritonitis, and non-union increase in direct ratio as we recede from the lines of safety.

5. The strength of a continued or Glover's suture is measured practically by its weakest stitch; if this tears, the remaining stitches are all more or less loosened and the end nearly always defeated.

6. Barring certain exceptions the continued or Glover's stitch is the most rapid, most uncertain, and most uneven stitch that can be applied.

7. No method of intestinal resection, however simple it may be, will receive full justice in the hands of even the most ingenious surgeon at its first performance. For this reason it should be the duty of all those expecting to engage in such work to thoroughly train themselves in intestinal operations in a practical way, either on lower animals or upon the dead subject.

8. The end-to-end method of restoring the continuity of the intestine in resections is attended with the least contraction and affords the most natural restoration of the intestinal canal.

9. The opening in all lateral anastomosis should be abundantly large (four inches) to allow for subsequent contraction, which always takes place to a considerable degree.

COMPARATIVE VALUE OF MECHANICAL DEVICES IN MAKING INTESTINAL ANASTOMOSIS.

By H. H. Grant, M. D.
Louisville.

Intestinal anastomosis has superseded circular enterorrhaphy because of the enormous difficulties of the latter method. This latter method is the ideal one, but within recent years it has been abandoned by most successful surgeons, because only with especial skill can any thing like satisfactory results be obtained. The dangers in this method are the loss of time in making the suture, the difficulty of getting accurate approximation of the mesenteric borders so as to provide against the risk of gangrene, the risk of leakage at the point of suture, the necessity in many cases of extensive resection in order to secure intestine of similar caliber at the point of approximation. These difficulties are enormously increased in many pathological conditions, both acute and chronic, and in many instances the surgeon has not the time to prepare to meet them. Objections equally effective can be made to the method of implantation, and the method of Maunsell is scarcely less free from criticism. These various methods will be presented by other Fellows of the Society, as arranged upon the program, and I shall reserve, until I come to discuss their papers, further reference to the objections and difficulties.

Lateral anastomosis avoids many of these difficulties, and even without mechanical aid is far easier to accomplish, and though at the present time direct suture is the most acceptable method, still these mechanical aids are largely used by the general profession.

The chief objections which lie against mechanical aids are that they make cumbrous material at the anastomosis; that in all instances a more or less foreign body is introduced; without exception the opening is smaller than safety demands, and that the security of the suturing is always open to question.

The oldest and most widely known of the mechanical devices are the bone plates of Senn. These plates, attractive both in theory and appearance, are bulky in practice, and the opening is limited to not more than an inch and a half. The raw-hide plates which were suggested by Robinson are more manageable, but are most too pliable for security; the potato plates of Dawbarn offer no advantage over the others, save the convenience of manufacture. All of them occasion a very considerable bulk to be reintroduced into the cavity, and to remain as a foreign body for three or four days at least with a necessarily small opening in the intestine. This opening can not be increased in size without not only correspondingly increasing the bulk of the foreign body, but in direct proportion diminishing the security of approximation. At this date no one except their originators uses either of these devices where he can get a Murphy button.

This ingenious device is not to be undervalued. The objections to it, however, have been plainly stated and clearly proved in recent surgical literature. It is necessary only to refer to them here and to cite you to the publication.*

I present you here one of the buttons, and will describe the method by which it is employed. It accomplishes its purpose well. It is claimed for it by Dr. Murphy, in his classical paper on "Intestinal Approximation," in the New York Medical Record, May and June, 1894, that the button can not become a foreign body. In the above-given number of the Annals of Surgery are reported four cases, three by Dr. Abbe and one by Dr. Kamerer, in which the button

*Annals of Surgery, February, 1895.

became a foreign body, with fatal result in three instances. It is also claimed in the same paper of Dr. Murphy that the objection that gangrene of the tissues within the clasp of the button would be a source of danger is purely mythical. In Case 3 reported by Dr. Abbe, above mentioned, death resulted from gangrene in the gut wall at the side of the button. Current literature also furnishes repeated illustrations of this same objection.

The term "pressure atrophy," applied by Dr. Murphy as to the process known to other pathologists as gangrene, or necrosis, is a refinement of terms. Nothing can alter the fact that all that portion of the intestine within the grasp of the button must separate by the process of ulceration and sloughing, call it what you may; but we all know that there are no limitations in nature or science which can successfully control the extent of ulceration on a peritoneal surface, and though the extension of the destructive process into the tissues, supposed to be safely beyond it, is only occasional, still the liability to it is constant and beyond our control.

In addition to this it is well known that the opening made by the Murphy button is too small for lateral anastomosis in the intestine, except, perhaps, in cases of malignant disease, and though this opening may be large enough for communications between the stomach and bowel in pyloric cancer, still the frequency with which the button falls in the wrong side of the anastomosis has tended to discourage operators against its employment.

The lateral intestinal anastomosis is now beyond all question the most acceptable method of resection of the continuity of the bowel, if we exclude the Murphy button. It is the best accomplished by direct suture; and direct suture, as I have before insisted to the profession, is difficult of successful accomplishment in any thing but very skilled hands. In order to facilitate this suture I have presented several times before a device for the clamping of the opposing sur-

face of the bowel, cutting a fenestra between them and retaining them so opposed until the suture can be completed.

I present you here the complete device. It consists, as you see, of two blades approximated as a clamp and bearing between them a concealed knife, capable of being withdrawn three and one half inches, which cuts a fenestra of this length. The resection having been made as for any of the other methods, the two cut ends of the bowel are held parallel and one blade of the clamp slipped into each, about five inches up the lumen of the bowel; the clamp is then tightened and held firm by a clasp on its handle; two provisional sutures are applied upon each side to prevent retraction of the edges when the fenestra is cut. The blades are covered with rubber tubing to prevent too great pressure on the gut walls. The concealed knife is now drawn out and pushed back again so as to insure division of the surfaces, and, while the clamp is held by an assistant, the surgeon rapidly runs an overhand suture of silk completely around the clamped surfaces, including the peritoneal and muscular coats; one row of sutures is enough. The clamp is then withdrawn, the finger introduced to assure the patency of the opening, the open ends invaginated, the cut surfaces of the mesentery secured against hemorrhage, and the anastomosis returned to the abdominal cavity. It can be easily accomplished in twenty to twenty-five minutes under ordinary circumstances; practice and skill can accomplish it in less time, and only considerable difficulties can prolong it to an hour.

I have experimentally used this clamp sixteen times with fourteen consecutive recoveries. I have had but one opportunity to use it in practice. In May 25th of this year I operated upon Mrs. E., aged fifty-one years, who had a fecal fistula at the right femoral opening, the result of a strangulated hernia operated upon eight months ago. She was in very depressed health, much emaciated, with swollen feet and legs and very feeble circulation.

An incision was made just above Poupart's ligament, near the fistulous opening. The fingers easily liberated in a few minutes the intestine, which presented an opening occupying half its lateral surface, about as large as a quarter of a dollar: I show you here a specimen. The mesentery was greatly thickened; the distal segment of the bowel was reduced in size, dilated at the site of the fistula. About four inches of the intestine were resected; the blades of the clamp were applied opposite the mesenteric borders of each segment, and the anastomosis made as above described. After the suturing Drs. Cartledge and McMurtry examined the communication between the opposing surfaces and found it ample; the cut ends were then invaginated and the anastomosis returned; the abdominal wall closed up with silk-worm gut sutures, the site of the fistula curetted and filled with iodoform gauze, and the patient put back to bed in forty-two minutes. Notwithstanding her feeble condition she reacted without difficulty. There was very little shock; the pulse never went above 100; the bowels moved on the second day in response to an enema, and she has steadily progressed in convalescence to the present time, and is now able to be about the halls of the institution. The operation was performed at the Norton Infirmary, and there were present Drs. McMurtry, Cartledge, and Mathews, of this city, and Cook, of Indianapolis.

The advantages of this method over the other aids, except the button, are manifest. Not only does it do away with the foreign body, but cuts an opening three or four inches long at the fenestra. It is fully as easily accomplished, and takes if any thing less time. It is no more difficult to use than is the button, but the operation can not of course be so quickly completed, as the invagination of the ends is not necessary after the end-to-end approximation by the button.

I must not be understood to disparage the button; it is a wonderful help, but it has great disadvantages. Is there a

man in this audience who would voluntarily swallow one for one hundred dollars! Surely not. Yet in all operations on the stomach and smaller intestine the button must pass the ileo-cecal valve. The clamp merely makes the direct suture easy to any ordinary skilled hand, and does away with the foreign body afterward.

It can be employed with equal facility in gastro-intestinal anastomosis without resection, by simply making a small slit in the walls to introduce the blades.

The clamp is manufactured by William H. Armstrong & Co., of Indianapolis, Ind.

DISCUSSION.

DR. H. H. GRANT, Louisville: I have only a few words to say in the closing of this discussion. For some reason or other I had a good deal less time than I appeared to have had at my disposal, and I did not elaborate sufficiently, as I desired to, the advantages that I conceive to belong to this instrument. I hurried through my paper because my time was limited.

Dr. Schachner has presented to you various methods of intestinal anastomosis by the mechanical aids and by the direct suture. He said that not only his observation of current medical literature, but his personal experiences have led him to believe that the most satisfactory, the most scientific and surgical method for making intestinal anastomosis of any kind is by the direct suture without the aid of mechanical devices. If the same advantages can be obtained, or if the same results can be accomplished, by direct suture without mechanical aid, it is manifestly the proper thing to do.

This device which I present to you is intended to hold the bowel after an opening has been made into it, so that it can be readily sutured by the surgeon. While the assistant holds up the intestines in the manner in which you see, after having stripped them, the clamp is promptly introduced, opened as I show you, and slipped into the two ends of the bowel opposite the mesenteric attachment, then clamped and the intestines firmly held. After the suturing the instrument is simply withdrawn and the ends invaginated. Nothing remains in the intestine to act as foreign

body. Nothing has been introduced in any way; simple suturing has been accomplished in the same way as it appears in the specimen as presented to you by Dr. Schachner. The surfaces are apposed by silk sutures only. One row is abundant. I have made this operation fourteen times, and succeeded in accomplishing a satisfactory result in each instance. All of these operations, it is true, were experimentally done upon animals with the exception of the last one, which was done upon a human subject, and the result was eminently satisfactory. The point that is chiefly made in favor of the clamp is that it facilitates suturing, admitted upon all hands to be the ideal method. It makes it as easy of accomplishment as any one of the mechanical aids makes it. It does away with every sort of foreign body and can have no possible competition except the Murphy button. The latter is an ingenious device, but has serious objections.

AN ATYPICAL CASE OF APPENDICITIS.

By Arch Dixon, M. D.
Henderson, Ky.

I wish to report the following case in order to emphasize the necesssity for early operation in all cases of appendicitis, whether they be acute perforating, fulminating with general peritonitis, or accute suppurating with local plastic peritonitis and abscess, or, in other words, as soon as the diagnosis is arrived at, regardless of the favorability of the case. I believe appendicitis to be an infective, exudative inflammation, septic in character from its inception. The very moment the appendix takes on inflammatory action there is at once provided a soil, rich in character, plowed, harrowed, and in every way fit for the growth of septic bacteria. The inevitable product of these bacteria is pus. What will be the result of this pus? Will nature be able by plastic exudation to form a chamber for the reception and retention of it securely sealed from the general peritoneum, or will there be a perforation with fulminating peritonitis, or suppurative peritonitis, of which Murphy says: "*We have no sign, symptom, or combination of signs and symptoms which with any degree of certainty indicate its existence.*" What shall be done in such cases when we know with almost absolute certainty that pus is either formed or is forming? What are the indications when pus is known to be present anywhere within the body? Unquestionably to evacuate it and give the patient thereby a better chance for his life. The rule applies with greater force in cases with unmistakable symptoms of appendicitis. For instance, you see a patient with a sudden attack of pain

in the abdomen, with nausea and vomiting, with local tenderness accentuated over the region of the appendix, with perhaps a rise of temperature and an accelerated pulse; the conclusion is that you have an inflammation of the appendix. An immediate operation is indicated, and it is the duty of the attending physician to so state to the family, and a surgeon should be called in at once. It is useless and dangerous to delay this matter; operation is imperative, and the sooner done the better. It may be urged that many cases get well without operation, and that it would be well to wait. *There is not a man living who can with any certainty differentiate the pathological conditions that exist inside the abdomen in a case of appendicitis.* The mere opening of the abdominal cavity can be productive of but little harm, and if properly done will in nowise prejudice the case. If there has been a mistake in the diagnosis, the cavity can be closed; if the diagnosis is correct the appendix can be removed, or treated otherwise, as the surgeon may elect, and perhaps the life of your patient saved. Nine times in ten there will be no mistake in the diagnosis, and I repeat that, in a case with symptoms such as I have given, it is an imperative duty that an operation be done. Nay, more: I would state that in a case with symptoms much more obscure, such a one as I am now going to report, it is the duty of the surgeon to operate at once. And I may state that this opinion has been largely strengthened since assisting in the treatment of the case mentioned. I shall first give the history of the case as furnished by Dr. W. A. Quinn, the attending physician, previous to the time the patient was seen by me. It is as follows:

R. D., aged eighteen; occupation, weighing clerk. On the afternoon or evening of January 11th felt a little pain in the abdomen, and on Saturday, about the middle of the afternoon, the pain had become so severe that he rode in a buggy from his place of business to his home.

Sunday morning at eight o'clock I was called to see him,

and found him with what then seemed to be an intestinal colic. His temperature was only slightly elevated (100.5°); his circulation was not at all disturbed, pulse 78; skin presented a perfectly normal appearance; tongue was coated and the bowels were costive. He complained of colicy or griping pains, and tenderness on pressure over the entire abdomen; some loss of appetite but no nausea. He had had no hot flushes nor chilly sensation; no sweats.

I carefully examined his belly; and percussion over its entire area revealed only the normal resonance, and palpation furnished no evidence of a tumor or induration. A hypodermic of morphia was administered, and three powders of calomel and bismuth ordered taken at intervals of four hours, to be followed by a full dose of Epsom salts.

In the evening at eight o'clock patient felt more comfortable; pulse 78; temperature 99.25°, and in very little pain; in fact he thought so lightly of his little indisposition that he expected to be able to resume his work Monday morning. On Monday morning patient stated that he had slept fairly well, his bowels had moved out freely and nicely, and he was feeling pretty comfortable. The pain on pressure was less marked than it had been before, but was now a little more pronounced centrally, just below the umbilicus and in the left iliac region. No flatness nor induration or other evidence of a tumor could be made out. Temperature 99°; pulse 76; had some appetite. Ordered five-grain doses of quinine at intervals of three or four hours. At eight o'clock in the evening the pulse, temperature, and condition unchanged.

On Tuesday morning, the 15th, patient expressed himself as having passed a good night, and feeling comfortable. Pulse 76; temperature 98.5°; still slight pains at intervals, with the tenderness over the abdomen slightly marked in the left iliac region, and less so centrally just below the umbilicus. A close inspection of the skin gave no clew to the trouble within, and palpation and percussion did not yet furnish

evidence of the character of the trouble. Nourishment was ordered, and very little else given during the day. In the evening the pulse was 78; temperature 99.5°; tympanitis a little more marked; condition otherwise unchanged.

I first saw this case on the 16th of January (Wednesday) in consultation with Dr. Quinn. Examination revealed very slight tenderness on deep pressure in the cecal region; more pronounced tenderness with slight dullness on percussion over the sigmoid flexure. Slight tympanitis over remaining abdominal region; tongue coated, brownish with red edges; temperature 99°; pulse 78. Diagnosis, local peritonitis, probably from appendicitis. Calomel, grains v, was ordered to be followed by saline; turpentine stupes over abdomen; morphia if necessary to control pain.

On the morning of the 17th (Thursday) the patient felt better; countenance bright, but general condition about the same; bowels had moved well; pulse 78; temperature 99°; tongue coated. During this day there was tenesmus with several stools dysenteric in character. Some induration with slight dullness over region of sigmoid flexure. No rigors. Opiates were given to control pain of tenesmus and check bowels.

On Friday, the 18th, there was slight increase of dullness over sigmoid region, induration more pronounced; patient had slept fairly well, and had taken nourishment frequently. Tincture of iodine and belladonna, equal parts, was painted over the induration, and turpentine stupes were ordered over entire abdomen. Quinine, which had been prescribed before, was kept up.

On Saturday patient was not so well; had a rather restless night; pulse still 78; temperature 99.5°; had tenesmus during the night with several copious stools; slight increase in area of dullness over sigmoid region, which now extended to median line. Tongue red on edges, dry, with brownish coating in center. Dr. W. M. Hanna was called in. The indica-

tions pointed to the formation of a pus sac (extraperitoneal), and it was agreed to aspirate on the following morning, and if pus was found to cut down and evacuate the abscess. A hypodermic needle was inserted with negative result.

On Sunday morning (the 20th) there had been a perceptible increase in the area and prominence of the tumor in left iliac region; pulse was still 78, and temperature 99.5°. Patient had passed a bad night. Aspirator needle was inserted, but only a slight quantity of serum was withdrawn. The needle was again inserted nearer the site of the first point of induration; result, a few drops of serum with decided fecal odor. After consultation further operative measures were postponed.

Patient passed a restless day and night, and on Monday morning, the 21st, he was found in the following condition: Pulse 122; temperature 102°; countenance haggard; pain over entire left side accentuated over the ninth and tenth ribs, in axilary line. Tympanitis was general and there was snow-ball crepitation, emphysematous at the point of the most intense pain. Perforation had taken place and operation was considered as the only hope. Dr. Hanna was not present at the time, but saw patient shortly afterward and fully concurred. At the request of the family Dr. Edwin Walker, of Evansville, Indiana, was present and assisted in the operation.

Operation was begun at 2:30 P. M. After opening the abdomen the intestines were found bound together by adhesions showing general peritonitis, in breaking up intestinal adhesions a pus cavity was ruptured far over in the iliac region, almost immediately over the sigmoid flexure.

The sac was adherent to the abdominal wall and to the intestines, and from the rupture, pus, fetid in character, welled out into the abdominal cavity. After emptying the pus cavity and flushing out the abdomen, further examination revealed a small stream of pus which came from an additional pus sac which probably communicated with the first by a very

narrow opening, or it may have been adherent to the first, and in breaking down the adhesions an opening may have been made into it. I am of the opinion that there was a communication between the two, as the walls of the second sac were thick and strong; however, the opening in the second was enlarged, and an enormous quantity of fetid pus was evacuated.

This sac extended from the left iliac region downward under the intestines through the folds of the mesentery to the cecum. The appendix was not found, nor was it particularly sought for. After thoroughly flushing out the sac and the abdominal cavity with hot sterilized water, a roll of iodoform gauze was passed entirely through the sac and through a counter-opening in the abdominal wall in the right iliac region. The abdomen was then closed and the patient put to bed with a pulse of 140, temperature 103.5°. Under the use of stimulants and the application of hot-water bags the body warmed up and slight reaction took place, but the pulse never came below 140, and the temperature gradually increased until it reached 107.5°. Patient was restless, but there was little if any pain after the operation. He grew weaker and weaker, and died at 1 o'clock A. M.

Taking this case as stated, with its obscure symptoms and slight constitutional disturbance, the question arises, When should operation have been done? Undoubtedly when the case was first seen by me, or before, though at that time I did not think so, but now I do not hesitate to say that, given a case such as I have described, with obscure symptoms, with slight disturbance of pulse or temperature, with tenderness over the abdomen, with no tumor or special pain over the region of the appendix, but which does not yield immediately to ordinary treatment, then I say an exploratory operation should be done. If there is trouble it can be righted, if there is no trouble very little harm has been done, and you have the satisfaction of knowing that you have done your duty.

Murphy (Journal of the American Medical Association, March 23, 1895), in reply to the question, When should we operate? says: As we are unable from the signs and symptoms to determine the exact pathological condition, are we justified in allowing the probability of fatal conditions to continue for such a period of time without such action as would place the patient beyond the possibility of rescue, even by operative procedure? No, not until such time as the physician is able to determine the exact pathologic condition and danger in the individual case, and indeed we must now consider that time far distant; he is not justified at the peril of the patient's life in restraining the surgeon from acting. It must be conceded by all that an operative procedure in competent hands is in itself one involving very little risk, while the continuation of the pathologic processes in many cases greatly jeopardizes the life of the patient.

There is only one safe position to take, and that is, in every case in which a diagnosis of appendicitis is made the operation should be immediately performed. It is true that many cases can recover without operation, but we can not differentiate in the early stages which cases are going to be favorable ones. It is further true that the earlier the operation is performed the less danger to the patient, and the greater ease of removing the appendix. In a majority of cases, if an operation be performed within forty-eight hours after the onset of the symptoms, the appendix is not yet ruptured, and can be removed without pus infection of the peritoneum, an advantage of which even the boldest surgeon is pleased to avail himself. In the later stage, if the surgeon is unfortunate enough to be called at the time that the peritoneum is flooded with pus and the patient collapsed, it is his duty to perform the operation and give the patient the advantage of the small percentage in his favor in this forlorn condition. *The rule first, last, and always should be, operate in every case of appendicitis, promising or unpromising, at the earliest possible moment.*

UNIQUE CASE OF STRANGULATED HERNIA.

By J. V. Prewitt, M. D.
West Point, Ky.

I was called in the evening of February 6, 1895, for the first time, to see Charles Q., of Shepherdsville, aged seventeen. I arrived the next morning, February 7th, Dr. Charles Cooper, of near South Park, being present by invitation.

The patient gave the following history of his present trouble: Has had rupture for the past two or three years; had been strangulated at two different times in the last eighteen months, but successfully reduced by Dr. D. M. Bates, of Shepherdsville. Three weeks ago, or about January 18, 1895, he was taken suddenly ill while sawing cord wood, suffering with abdominal pains over the region of the groin, occasionally vomiting, and tumor being present in the right side; a physician was summoned, but his condition continued to grow worse, intestinal obstruction seemed complete; opiate was given internally to relieve pain, and poultice applied over tumor. Seven days later the patient was greatly relieved by the attending physician lancing the scrotum on the right side, which was followed by a discharge of fecal matter mixed with pus. On examination I found that nature was establishing an artificial anus over the right inguinal canal at the external ring, and by the use of a probe I was able to connect the opening at the external inguinal ring with the opening that was discharging fecal matter in the scrotum, which occurred four or five days prior to the opening at the external inguinal ring. The disturbance to the cellular tissue in this region was due to the gan-

grenous condition of the parts strangulated, resulting in much sloughing; even the right testicle had sloughed away. I visited patient two days later (February 8th), irrigated the two openings with a bichloride solution, 1 to 2,000, and also the fistulous tract connecting the two openings, which I closed by packing with iodoform gauze from the opening in the scrotum to the upper opening in the external inguinal canal. Patient's general condition improved for several days, but later on he improved very slowly, if any. Having given the fecal fistulous tract special aseptic advantage, and seeing that there was but little prospect of a spontaneous closure, I advised operative interference, to which he consented. February 22d I operated, Dr. D. M. Bates administering the anesthetic, Dr. Holtsclaw and Mr. S. W. Bates, a medical student, assisting. The entire inguinal and pubic regions were shaven the day before and the parts disinfected with ether and with a 1 to 2,000 bichloride solution. The upper bowels were moved the evening before, and patient had nothing but a liquid diet for forty-eight hours before the operation. Towels were rung out of a bichloride solution, after being boiled, and placed over the operating table and wherever needed; an incision was made through the abdominal wall two inches long, just above the fistulous opening and directed upward and a little toward the median line. Finding the adhesions numerous, I was compelled to extend my incision about three inches higher up, opening the general cavity, thereby allowing me sufficient room to deal with the situation. I found the end of the cecum lying in the fistulous tract; after carefully dissecting it out I found that a part of the end with the appendix vermiformis had sloughed. The opening in the end of the cecum would admit my two thumbs. The border of the opening was excised and closed by a Czerny-Lembert suture, and the edges lightly scratched. The intestines were protected by warm sponges, and by warm water constantly being poured on them. The fistulous

tract was excised. There was found in the general cavity a strip of omentum six inches long and the width of the index finger, being attached to the omentum at one end. After flushing the cavity with a 1 to 10,000 bichloride solution, the abdomen was closed in the usual manner, excepting the lower border of the wound was left open to fill up by granulation, it being packed with iodoform gauze and a rubber drainage-tube inserted. Patient made a good recovery with but few unfavorable symptoms. He was annoyed with cramps in the region of the ascending and descending colon, having to be controlled by morphine hypodermically. On the evening of the fourth day salts were administered, and on the morning of the fifth day his bowels moved *per rectum*, being the first time since his illness, which had been five or six weeks.

THE DANGERS OF CHLOROFORM ANESTHESIA: HOW TO AVOID AND OVERCOME THEM.

By Frank C. Wilson, M. D.
Louisville, Ky.

The frequent occurrence of death during the administration of anesthetics forcibly impresses upon us the dangers incurred and the importance of a careful review of the subject. A community is shocked by the announcement of the sudden death of one about to undergo some trivial surgical operation. Ineffectual efforts at resuscitation having been made, the coronor is called, an investigation held, and a verdict returned of unavoidable death during the administration of an anesthetic.

If happily the efforts to resuscitate have been successful, the patient is brought back to life from death's door, and the intense strain lifted from the lives of the doctors concerned, and possibly the patient never realizes the danger from which he has so narrowly escaped.

Dangers may arise:

1. From impurity in the anesthetic used.

2. From administering it to improper subjects or to those not properly prepared.

3. From administering it in an improper manner.

4. If an accident occur the danger will be vastly increased by a failure to detect the earliest indications and to promptly institute measures of resuscitation.

5. Danger is increased in proportion to the prolongation of anesthesia.

As by far the greater number of deaths occur from the administration of chloroform, I will direct the most of my

attention to a consideration of the dangers incident to its use. The selection of the anesthetic to be used, however, should be made with the greatest care, choosing the one best suited to the individual case. If there be serious disease of the bronchial tubes, or of the kidneys, then ether should *not* be used. If there is a condition of extreme prostration from any cause, then ether should be preferred to chloroform.

The danger from impurity of the anesthetic used may be minimized by using an article carefully tested and vouched for by a reliable maker, or, better still, by using only such as you have yourself carefully tested.

In chloroform there may be present acid, usually hydrochloric, revealed by the use of litmus paper, and by precipitating with silver nitrate.

If the specific gravity is under 1.488 alcohol is most likely present. Aldehyde, if present, produces, when heated with caustic potash, a brownish color, and when heated with a solution of nitrate of silver, a silvery film upon the sides of the test-tube.

Organic and empyreumatic substances are revealed by coloring sulphuric acid when shaken with it. If shaken with water and then the water added to cooked starch in the presence of potassium iodide, the blue color indicates the presence of chlorine.

Chloroform, if pure, should leave no residue after evaporation, nor should there be any odor left. Pictet chloroform is said to be absolutely pure.

Every patient should be carefully examined, the condition of the heart and lungs known, and that of the kidneys ascertained by the test of the urine.

If there is a condition of great prostration or collapse from any cause, then chloroform, if used at all, should be watched with the greatest care. In such cases ether is to be preferred.

Simple, uncomplicated organic disease of the heart does not necessarily preclude the use of chloroform, but ether is

safer unless there be present bronchial inflammation, or disease of the kidneys.

If there be found affections of the brain, chloroform is best. Examine the mouth to ascertain whether there are false teeth or plates, and if present insist upon their removal.

The proper preparation of a patient will require abstinence from food for four or five hours prior to the operation, the promotion of a tranquil state of mind by cheerful and assuring conversation. One or two tablespoonfuls of whisky should be given a half hour before, or, in lieu of this, one fourth grain of morphia with atropia, or one fourth grain sulphate of spartein may be used hypodermically.

Rosenberg observes that cardiac syncope is an accident of reflex origin, due to an excitation of the peripheral terminations of the trigeminus in the nasal membrane. He thinks that the local use of a spray of a two-per-cent solution of cocain in the nose will suppress all the phenomena of reflex irritation and eliminate much of the danger incident to chloroform anesthesia.

All clothing which will in any way interfere with respiration should be loosened. If the weather is cool, see that the body and limbs are warmly protected.

The best and safest mode of administering the anesthetic is that which will procure anesthesia with the least degree of resistance and struggling. The simpler the apparatus the better.

Many of the various forms of inhalers are complicated and hard to keep clean. The simple wire mask covered with cloth, upon which the chloroform is dropped, is both efficient, economical and cleanly.

In the use of chloroform with the cone, and with many of the inhalers, it is impossible to estimate the amount of chloroform the patient actually inhales. It is not the amount of chloroform which has been poured upon the cone, but the quantity which has passed into the circulation, which is the vital question.

In order to obviate this difficulty I have adopted the plan of vaporizing the anesthetic from an atomizer, the bottle being so graduated as to indicate at a glance exactly how much is being used. As chloroform is thrown into the inhaler or cone none is wasted, but all passes directly to the lungs, and there can be no uncertainty as to the amount used.

The first inhalations should only be commenced when the surgeon has so far advanced in his preparations as to insure no delay in commencing the operation as soon as the patient is fully anesthetized. To have to keep the patient under the anesthetic five or ten minutes, while the surgeon completes his preparations, is to jeopardize his chances to that extent.

The inhalations should be commenced so gradually and the vapor so largely admixed with air as not to induce struggling, coughing or strangling. If either of these conditions supervenes it indicates the necessity for the admission of more air.

The pulse and respiration should both be watched closely, and the first irregularity noted in either or both should be instantly followed by a withdrawal of the anesthetic and a substitution for it of oxygen gas.

The sensibility of the cornea should be noted and the pupil closely watched. After the pupil has been contracted, to note a sudden and wide dilation should be accepted as a warning of danger and promptly acted upon.

Every known means of resuscitation should be at hand so as to be used without delay *when needed*, for only then can efforts be effective. It would be well, therefore, for every one who is often called upon to administer anesthetics, to be provided with a regular anesthetic case containing every appliance and remedy that can be of service in any possible emergency.

There should be found in it, besides a bottle of tested chloroform and a can of pure ether, the most convenient appliances for administration, a cylinder of compressed oxy-

gen, provided with the necessary tubing for attachment to a face-mask or to a soft rubber laryngeal tube, the use of which may be necessary if artificial respiration is required. The attachments should also be arranged so as to be able quickly to substitute it for the chloroform vapor when any threatening symptoms are noticed.

In this case there should be a hypodermic syringe ready for instant use, together with prepared standard solutions of strychnia, atropia, digitalis, and nitro-glycerine.

In an emergency, to consume four or five minutes in preparing the hypodermic solution is to lose valuable time which may cost the patient his life. Every thing done should be without delay. Therefore all solutions for hypodermic use should be prepared and ready for instant use.

An aspirator may possibly be needed to relieve the engorged right heart.

A vial of good whisky should not be overlooked, and one of ammonia may be needed. Also a few pearls of nitrite of amyle.

It is questionable whether a faradic battery can be of any real service. Some even contend that its use is harmful rather than good.

The ever-watchful chloroformist, *not the surgeon*, should be the first to note signs of danger, such as the irregular breathing or the failing pulse, the sudden pallor of countenance, the rapid and wide dilatation of pupil previously contracted. As soon as any of these signs of warning are noted, the chloroform should be instantly withdrawn, the head lowered by removal of the pillow and even by allowing it to hang over the edge of the table. As claimed by Bard, this position has special advantages, in that it lessens the friction of the inspired and expired air, raises the epiglottis, occludes the esophagus, opens the epiglottis, diminishes liability to syncope, prevents stertor, and increases the capacity of the thorax. The feet should be elevated, the chest compressed, so

as to expel as far as possible the contained air which is saturated with chloroform not yet absorbed.

If no efforts at breathing are yet noticed, artificial respiration should be at once instituted, and kept up as long as there is any hope of success. While artificial respiration is being practiced, oxygen gas should be given so as to quickly displace the chloroform still present in the system. If the heart is still beating, though weak, inject hypodermically one thirtieth grain of strychnia nitrate, or one hundredth grain of nitro-glycerine. Whisky should also be given subcutaneously.

As in the asphyxia of the new-born, the sudden impression of cold, as by the application of ether to the surface, or the insertion of an ice-pencil in the rectum, may cause a quick inspiration which will turn the tide from death to life.

The responsibility of the anesthetizer does not cease with the termination of the operation, but only upon the return to complete consciousness. And he should be fully assured of the satisfactory condition of the patient before he leaves the room.

The nausea and vomiting, so often troublesome and annoying to the patient and jeopardizing the success of the operation, may be greatly lessened, if not entirely prevented, by following the chloroform with a few gallons of oxygen gas. By this method the effects of the chloroform are quickly dissipated and the return to consciousness the sooner attained.

No one should assume the rôle of an anesthetizer who is not fully impressed with the responsibility of his position, and willing to give his undivided attention to the duties devolving upon him. Surgeons sometimes rashly commit this work to junior assistants, or even to students, who are more interested in watching the steps of the operation than in attending to the duty assigned them. Fatal result is too often the consequence, only discovered by the surgeon from the cessation of hemorrhage. Precious time may thus have

been lost and with it the opportunity of applying successful efforts at resuscitation.

If the precautions herein mentioned should be always followed I am convinced we would seldom hear of a death under chloroform.

DISCUSSION.

DR. J. M. HARWOOD, Shelbyville: I would like to ask Dr. Wilson how much chloroform he gives the patient before he is under the influence of it, as he seems to lay great stress upon the quantity.

DR. WILSON: The indicator on the bottle tells how much chloroform the patient has taken, and the amount varies greatly in individual cases.

DR. T. B. GREENLEY, Meadow Lawn: I consider this a valuable paper, and if all the precautions stated by Dr. Wilson were observed in the administration of chloroform we would rarely have accidents, or rarely would we be called upon to use our efforts at resuscitation. In old times it was common to give chloroform to every woman or man for a trivial operation. I have given it for pulling teeth in the days which Dr. Beeler talks about. I recall three cases where breathing was arrested. One was an amputation of the toe. I could not attend to both the operation and the administration of the anesthetic. The anesthetic was therefore administered by a student, and the patient stopped breathing. Fortunately we had water very convenient, so I threw it into the patient's face and she continued to breathe. Some people get under the influence of chloroform too quickly. In the case of a lady for whom I was to extract a tooth, she seemed to be fond of chloroform and inhaled it very rapidly, but all at once she stopped breathing. Having had experience in the other case, I threw a glass of water in her face, she caught her breath, and I pulled her tooth out before she came to. In another case, was doing a little operation for closure of a lacerated perineum or cervix, and the patient suddenly stopped breathing. In this case I spanked the bottom of the feet and it had an admirable effect in producing a reflex action, and breathing commenced again very readily. I am told by some who have tried it, that dilatation of the anus is one of the best things to bring about that nervous reflex action to induce breathing.

DR. GEORGE W. BEELER, Clinton: Our object in these discussions is to contribute something that will be of benefit to the members of the Society, and more particularly the younger ones who are here. The doctor has given us a very good paper, and he has shown us an apparatus which is exceedingly useful. I would like to have it, and I am sure you would all like to have it, but we can not all be supplied with such a nice arrangement as this, and consequently we have to resort to something else. I agree with the doctor in every thing he has said. In regard to the amount of chloroform, I think we sometimes make a mistake in not giving enough. I lost a patient once because I did not give enough of it. I am satisfied of that. The anesthetic was given for the purpose of extracting a tooth. I had extracted teeth for several years before for the same patient and the symptoms were so alarming that I concluded the next time I would not give very much chloroform. I extracted one tooth and the patient complained a good deal. The moment I applied the forceps to her tooth her heart was paralyzed and she did not breathe any more. I resorted to injections of strychnia, electricity, and other measures, but nothing could restore her. To be sure, those who give chloroform must observe the rules the doctor has given us. They are all good, but when you give chloroform to pull teeth have the patient in a horizontal position, giving, as the doctor suggested, a little whisky beforehand. When you perform an operation give enough chloroform, and you need not be afraid if you watch your patient carefully.

DR. HENRY E. TULEY, Louisville: I was very much interested in Dr. Wilson's paper, and as regards the giving of whisky before the administration of chloroform in so short a time as half an hour, I think it will oftentimes excite vomiting. It is astonishing sometimes to see the amount of fluid that patients vomit who have not taken any thing into the stomach for three or four hours after whisky is given to them. If whisky is to be given, it should be administered longer than half an hour before.

With reference to the reflex irritation, I believe that if we can anesthetize the mucous membrane of the nose, or if we can make patients breathe through the mouth through the first stage, oftentimes we can do away with the reflex irritation, and I believe that the nausea and vomiting and other disagreeable symptoms which follow are lessened to a great degree by the

mouth inhalations. In giving chloroform we should always use a graduated bottle, such as the doctor has shown us. The danger in chloroform anesthesia in my opinion is due to the amount of vapor in the system at a given time. If a folded towel cone is used, and two or three ounces placed in the cone, and the cone placed immediately over the face, the patient will be in danger of inhaling a dangerous amount of the anesthetic. Therefore I believe a minimum amount should be given in order to get systemic anesthesia. A graduated bottle should be used and the amount watched closely. I consider the pupil one of the most valuable signs as to the condition of the patient during anesthesia. Very frequently we find patients whose pupils are naturally very large, and I think that should be one point we should notice in giving chloroform. We should see whether or not the pupils are normal or abnormally large. In these cases when anesthesia is induced to a surgical degree the pupils will not contract to the size of those of other patients.

The doctor spoke of removal of the pillow when resuscitation was necessary. In my opinion the removal of the pillow should not be put off until the signs of narcosis have set in. We know chloroform anesthesia is maintained by cerebral anemia, and we should take out this pillow early, as patients frequently will not submit to a lowering of the head when anesthesia is begun, but I believe as soon as they begin to go into an alarming state the pillow should be removed at once and kept so, and the head placed on a level with the body throughout the operation.

I think the habit of allowing the nurse or the attendant to place the patient in bed and allowing him to become conscious in their presence and not in the presence of the physician is wrong. The doctor should wait until the patient is entirely conscious.

A remedy which the doctor has not mentioned, and which I have found to be efficacious, is recommended by a Frenchman whose name I do not at present recall. It consists of the inhalation of vinegar immediately after nausea is present. If a handkerchief saturated with vinegar is placed in front of the patient's nose, it will very often quiet the stomach and lessen the irritation.

DR. F. L. LAPSLEY, Louisville: During the past few months I have had occasion to give chloroform several times in my hospital practice, and in the series of cases I have had I have met with three accidents. My practice has been to dilate the sphinc-

ter ani, which is followed by immediate resuscitation. I consider this the most rapid means of resuscitation we have at our command and one we ought not to omit.

DR. CARL WEIDNER, Louisville: I think Dr. Wilson has given us an excellent paper, and this subject is one of paramount importance. It has interested surgeons all over the world since we have had anesthesia, and we ought to be glad to get any points which will in any way aid us or prevent us from doing harm. I think it was simply an oversight on the part of Dr. Wilson that he did not mention the preparation of the patient as to feeding. I think that an empty stomach is one of the most important points for us to consider, and if necessary emptying it artificially so many hours before the operation so as to get rid of the contents and accumulation of gases and to avoid undue pressure from below. This in itself will lessen the amount of vomited matter which Dr. Tuley has spoken of, and on which more stress should be laid.

In this connection I would mention a method which is recommended and advised by Rosenberg in one of the recent numbers of the *Berliner Klinische Wochenschrift*. I have seen an extract of his paper in some American journal, and he speaks of the beneficial effect of cocaine. He agrees with Dr. Wilson that the majority of chloroform deaths are due to paralysis of the heart, and he says by giving cocaine, applying four, eight, or ten per cent to the nose by means of a spray, and repeated for several minutes, it will allay the symptoms. In my experience with chloroform, death occurs early, if at all, and for that reason it makes very little difference about the quantity of chloroform used.

DR. F. J. YAGER, Campbellsburg: I have been giving chloroform for forty years. I do not do much surgery now, and very frequently I call in specialists to help me in my surgical work. I give the chloroform myself and watch the patient carefully, and I believe every surgeon that has ever operated for me has eulogized my method of giving it. All the means that have been spoken of are good. When I want to have an operation performed I do not allow my patient to drink a great deal of milk, and a good deal of this and that. I keep the patient in proper order up to the time of the operation. I place my patient in an airy room, and have my bottle of whisky at hand, a bottle of

ammonia handy. I also have my syringes handy. Just before the operation I examine the lungs and heart to see whether they are all right or not. Every thing being in good condition, I simply take a big open towel, saturate it with the chloroform, and administer freely in that way. I have never had a death, and have always succeeded most admirably by this method.

DR. WILSON (closing the discussion): The first question asked is with reference to the amount of chloroform used. Of course that depends upon what is being done. The point I desired to bring out was that we could form no adequate estimate of the amount of chloroform that was used by the ordinary mode of administering it, or rather the amount that was being taken into the lungs. With the apparatus I speak of, and which I have shown to you, every particle that disappears from the bottle goes into the lungs. It can not go anywhere else. It is thrown by the atomizer into the inhaler and is bound to go into the lungs. If, say, forty minims disappears from the bottle, we know it has entered the system. We can not follow it clear out and positively say that this amount has been absorbed. We know it has left the inhaler. We can not say as much for the towel or cone. We can not form any sort of estimate as to the amount of chloroform that will be needed in individual cases. In several instances where there was a simple operation, such as dilatation of the sphincter ani, and the effect of the chloroform was needed only a few minutes, I have placed the patient fully under the influence of it, with as little as forty and fifty minims of chloroform, and all of you know for that operation the deepest degree of anesthesia is required; hence we find the greatest number of accidents occurring in just that sort of work. From my observations that is all that is necessary for an ordinary simple operation. Where an operation is prolonged I generally prefer to follow it up with ether rather than keep the patient under chloroform alone for any prolonged period.

PNEUMONIA.

By George E. Davis, M. D.
Salvisa, Ky.

The doctor in charge of a case of pneumonia, than in most any malady, comes nearer holding his patient's life in his hands, and therefore more nearly culpable in case of a fatal issue. However, seen early, gotten under control in the incipiency, carefully watched and properly managed, the patient nor the physician need entertain great solicitude as regards the result. But withal, the insidious nature of an enemy so potent of harm as pneumonia makes eternal vigilance often the price of life, lest we realize too late its devastating power.

Much depends upon our conception of the individual case, a thorough knowledge of the several stages of the disease, and the therapeusis suitable to each stage, as to whether the malady or we first gain control of the patient. And as priority of control plays an important rôle as regards the final result, the keynote to the treatment is to begin early, administer boldly, but prudently, until the effects of the remedies are obtained, then to maintain the effect by graduated doses.

By boldness we do not mean the heroic measures of venesection, aconite, and veratrum even in the first stages. The first two are seldom or never justifiable, and the last, though less potent of ultimate harm, has a more efficient, agreeable, and safer substitute in opium or some of its alkaloids, which meet more of the indications, even of the first stage, than does veratrum.

Celerity of therapeutical action being demanded, however, it behooves us to select remedies with whose physiological

actions we are thoroughly familiar and to *push* them. Observe no routine. It is a lamentable fact that too often we are prone to observe some routine which renders us oblivious to the importance of individual observation and original investigation, and the advance of years reveals that we are not leading but following the march of progress. If only part of a measure or minimum of a drug be sufficient to meet a certain indication do not go beyond; if the limit or maximum be required, you can not do less and do the most good.

And since a clear-cut diagnosis of the several stages of the disease is necessary in order to institute rational treatment we will review the clinical history and anatomical characters of the three recognized stages.

Clinical History. Briefly, in the first stage the indications to be met are shock, pyrexia, pain, cough, and expectoration; in the second stage, with the exception of shock, the same indications obtain, but in a modified degree, however, the cough and expectoration originate from a different source, the bronchial mucous membrane. In the third stage we still have the same indications, but in a much modified degree. The cessation of pyrexia may be replaced by prostration.

Anatomical Characters. Wide distension of the pulmonary capillaries with blood, and engorgement of the air-cells with serum containing red and white blood-corpuscles and epithelial cells characterize the first stage; coagulation and consolidation of the above blood and serum, and congestion of the bronchial mucous membrane characterize the second stage; and resolution or granulo-fatty degeneration of this consolidated mass, rendering same capable of absorption, characterizes the third stage.

We will give a synopsis of what we regard the proper management of a typical case of acute lobar pneumonia, which we are supposed to see within a few hours of the chill or inception of the attack. For clearness of presentation and to demonstrate the rationale of the treatment proposed

the management of the several stages is taken up separately. Our aim has been to select drugs and measures whose physiological actions best meet the indications which the clinical history and anatomical characters of the several stages seem to warrant.

Treatment: First Stage. If the patient be adult, strong, and presents in a marked degree the clinical features of this stage, which, as above enumerated, are shock, pain, pyrexia, cough, and expectoration, administer hypodermatically morphia sulph., gr. ½, atropia sulph., gr. $\frac{1}{75}$, and repeat in an hour half the dose if the first does not produce a decided effect.

Now how many of these several indications does morphia meet, and how? As regards the first two, shock and pain, we know that it acts as a specific and through the nerve centers. It reduces *pyrexia* in two ways: First, indirectly, by overcoming *shock* and lessening the abnormal destructive metabolism of the nitrogenous elements; second, by equalizing the circulation. This equilibrium is restored, first, by toning the heart, second, by toning the pulmonary capillaries (which are widely distended with blood, the first anatomical character observed in this stage), and causing them to contract and force the blood through the pulmonary parenchyma for oxygenation, thereby eliminating the excess of carbon dioxide and quieting the exaggerated respiration by rendering it unnecessary. The restoration of the vaso-motor tone of the pulmonary arterioles also aids the absorption of the accumulated serum in the air-cells, the second anatomical character observed in the first stage.

To illustrate the power of morphia to equalize the circulation is sufficient plea for the following report and brief digression: Shortly before the death of Mrs. F. J., who was dying from pulmonary phthisis, the radial pulse became imperceptible, the face, hands, and general surface cold and deeply cyanosed, respiration gasping. In fifteen or twenty minutes after administering morphia sulph., gr. ⅛, the pulse

was easily discerned at the wrist, the surface regained its normal color, and respiration became easy.

Morphia meets the fourth and fifth indications of this stage, cough and expectoration, first, by lessening sensation, second, by removing cause for same through its effect exercised over the pulmonary circulation as explained above.

If further testimony is needed to verify all and more than is above claimed for the *poppy* in the first stage of pneumonia, the following report is the best evidence: Mrs. N. B. G., aged sixty, strong and well preserved for her age, had suffered with *cold* for a day or two and was exposed to rain and snow after having become overheated cooking dinner. At 2:30 P. M. she had a hard chill, accompanied by cough, pain in left side, and much shock. At 5 P. M., when I saw her, the features were pinched and anxious, the surface dry and hot, pulse 120, and full, temperature 100.4° F. Her cough was accompanied by the characteristic tenacious rusty expectoration. Auscultation revealed bronchial breathing and fine râles over the lower lobe of left lung posteriorly, and exaggerated breathing over right side. Percussion showed dullness over lower lobe of left lung posteriorly. Morphia sulph., gr. ½, and atropia sulph., gr. $\frac{1}{75}$, was given hypodermatically, and half the dose repeated in an hour. Shock, pain, and cough were relieved at once, followed by a quiet night's rest. The next morning the pulse was 90, temperature natural, and the attack *aborted.*

The auxiliaries to morphia in the first stage are phenacetine, dovers, and quinia, *q. s.*, to maintain control, and these may be supplemented by counter-irritation secured by dry cups, sinapisms, and turpentine stupes. Apply quilted jacket of cotton batting to insure the equity of surface temperature. Make jacket to open in front for convenience in using topical applications, but more especially to apply tepid or cold sponging, provided you have a competent nurse. Brisk massage during the sponging can not be insisted upon too much. By cold sponging thus employed the capillaries of

the surface are dilated, counter-irritation secured, congestion of the deeper organs relieved, pyrexia reduced, shock and pain quieted. Sponging may be repeated every three or four hours if pyrexia remains above 103° F. Revulsion by vigorous catharsis or a mustard foot-bath is no mean advantage.

Second Stage. Digitalis and strychnia, aided by belladonna, ammonia, and whisky, is the treatment in this stage. Phenacetine, dovers, and quinia may be continued *cautiously*. The following method for the administration of digitalis is suggested by Bond, viz., Begin with a medium dose of the fluid extract or tincture and gradually increase until the pulse is reduced to a little below normal, then decrease till the normal pulsation returns, and hold it at that until all expectoration subsides, then gradually decrease until you can safely leave off.

The rationale of digitalis in this stage is obvious when we study its physiological action and remember the indications. It husbands the heart's strength by stimulating the pneumogastric, thus slowing the heart-beat and improving its nourishment. It stimulates directly and powerfully the heart-muscle, causing a complete systolic contraction, making it possible for the right heart to entirely empty itself, and relieves it from the danger of overdistension from accumulation. The venous blood is driven to the general arterial system. By repairing the circulation the elimination of carbon dioxide gas is facilitated, a morbid excitant of the respiratory center is removed, and indirectly respiration is quieted. Again, digitalis by its influence over the pneumogastric directly regulates the respiratory rhythm.

The effects of digitalis besides those on the heart are: (1) Antipyretic; (2) antiphlogistic, through its influence over the vagus by restoring vaso-motor tone to the pulmonary capillaries and controlling the flow of blood to the inflamed lung (and hence soon checking expectoration by rendering it unnecessary); (3) sedative; (4) diuretic.

Belladonna comes to the rescue of digitalis by restoring vaso-motor tone, preventing the leaking of blood into the capillaries, keeping the blood to the great nerve centers to supply them nourishment and sustain vitality until the crisis is passed. It also aids respiration. Strychnia supplements digitalis by stimulating the heart muscle, vaso-motor system, and the respiratory center. Besides it acts as a general nervous sedative. The sulphate is the best preparation, and to do good must be pushed. Whisky in moderation every two to four hours not only acts as a stimulant but serves as a food. As long as whisky slows the pulse, moistens the tongue, and quiets the patient, it acts as a *stimulant;* pushed beyond this it becomes a *depressant*, the heart is exhausted, and the object of its administration defeated.

Third Stage. The supportive treatment is continued in a modified form. Chloride of ammonia and sometimes iodide potassium are useful in hastening resolution.

Hygiene. This term embraces ventilation, the toilet, diet, etc., and must be respected and personally supervised if we wish the best results.

Mortality. In uncomplicated pneumonia, with proper management, the mortality should approximate *nil.*

THE MOST SUITABLE AMERICAN CLIMATE FOR CONSUMPTIVES.

By A. H. Stewart, M. D.
Richmond, Ky.

While it has been well said that tuberculosis "is a disease of all times, all countries, and all races," and "that there is no known climate that makes it a necessity or renders it an impossibility," yet there is no fact in the etiology of the disease better established than that it is more prevalent in some countries and among some races, and some individuals are more susceptible than others, and that persons suffering from the disease do better in some climates than others. The inevitable conclusion, then, is that those climates in which the disease is most prevalent either favor the development of the specific organism of the disease, or render persons residing in such climates more susceptible to the action of these organisms, or both.

Laboratory experiments show that moisture, darkness, bad ventilation, and moderate warmth increase the vitality and virulence of these specific organisms, and increase their power to propagate their species, and that dryness, light, especially sunlight, moving atmosphere, and extreme temperature, either hot or cold, especially the latter, lessens the vitality and virulence of these organisms and diminishes their fructifying powers. Observation has also shown that cold and moisture, and, to a less extent, warmth and moisture, retard the transpiration of the fluids of the body, both through the skin and respiratory mucous membrane, diminish the excretion of urea and carbonic acid, induce con-

gestion of the internal organs, especially the lungs and kidneys, favor colds and catarrh of the respiratory mucous membrane, lessen hemoglobin and other vital constituents of the blood and tissues, and in this way weaken potential and kinetic cell energy, and favor tuberculosis. While, on the other hand, cold and dryness, and, to a less extent, warmth and dryness, increase the transpiration of the fluids of the body, facilitate excretion of urea and carbonic acid, relieve overtaxed viscera, favor oxygenation, increase hemoglobin and other vital constituents, and thereby increase latent and active cell energy, favor constructive metamorphosis, and therefore oppose tuberculosis. It has been further shown that if to dryness there be added a considerable degree of rarefaction, with its usual favorable accompanying influences, sunshine, lowered humidity, lower temperature, and increased diathermancy (power of transmitting radiant heat), the above beneficial effects are doubly intensified, with the additional benefits of accelerated and strengthened heart-action and respiration, increased appetite and assimilation, increased thoracic and pulmonary ventilation, and increased absorption of infiltrated exudation and broken down *debris*. The latter obviates the necessity of forcible expulsion by cough and expectoration, removes so much additional culture soil for the tubercle bacillus, and even an additional amount of bacilli themselves. In this way these climatic attributes exert both a direct and indirect beneficial influence on the body organism, and thus favor the healing of morbid conditions in the lungs.

As the reduction of atmospheric pressure comes at the rate of half a pound to the square inch of surface for each thousand feet of ascent, and as lowered temperature through atmospheric expansion, which also gives rise to lowered humidity, comes at the rate of about three degrees for each thousand feet of ascent, these favorable climatic conditions are naturally found in the greatest abundance in such high, dry

regions in the interior of continents as the Alps in Europe, the Rocky Mountains in the United States, and the plains of Nubia and plateaus of Abyssinia in Africa, where solar and terrestrial radiation are the greatest. Consequently these places are fast becoming the Meccas for the consumptives of these respective countries.

It is true that in the United States the Adirondacks in New York, the Lower Alleghanies in North Carolina and Georgia, the pineries of Georgia and South Carolina, and the far-famed peninsula of Florida, still have their advocates. They certainly serve good purposes as season resorts, and doubtless give temporary and perhaps permanent relief to many. Indeed, so far as they afford increased dryness and purity of air, and increased opportunities for out-door, open-air exercise, to that extent they are improvements over home, and are therefore in this indirect way beneficial. But as it has not been demonstrated that the climates of these localities exert any positively curative influence over such pathological conditions as lung cavities, it is little less than criminal when such a disease as tuberculosis is rapidly sapping the life-blood from our patients, if we are depending upon climate at all, to be content with climates which possess only indirect curative properties, when climates which are known to possess the very highest degree of therapeutic value are within our reach.

In the United States these desirable climatic factors are found in the greatest abundance on the great plains and plateaus of the West.

Indeed, with the exception of the extreme northern portion of the Pacific Slope, most all of that vast region of the United States west of the one hundredth meridian offers greater advantages to the consumptive than even the most favored portions east of this line.

As the principal moisture precipitated in the United States and east of the Sierra Nevadas comes from the Gulf of Mexico

and the Atlantic, chiefly from the former, for in the ranges west of the Alleghanies precipitation naturally decreases north and west from the Gulf and Mississippi Valley, and as mountain ranges intercept the passage of rain-bearing winds, the precipitation is less over the plains than over the prairies and less over the parks and plateaus than over the plains, and still less over the great basin than over the plateaus. The decrease over the plains is gradual as they increase in elevation till the Rocky Mountains are reached, where most of the remaining moisture is extracted, so that west of these there is little vapor to be precipitated. Likewise the Coast Range and Sierra Nevadas extract most of the moisture from the rain-bearing winds which come east from the Pacific, so that little moisture remains after the region of the great basin is reached by these winds. Consequently, as the plateaus are approached either from the east or west, moisture and clouds are diminished, and sunshine and dryness proportionately increased, so that the minimum of the former and the maximum of the latter are found over this central region. Thus the annual average rainfall at New Orleans is sixty-five inches; at Memphis, fifty-five; Cairo, forty-seven; St. Louis, thirty-eight; Dodge City, twenty; Denver, seventeen; Prescott, Arizona, fourteen; Winnemuca, Nevada, eight; Yuma, Arizona, two; Sacramento, twenty-two; San Francisco, twenty-four. The comparative cloudiness, per cent of time the sky is cloudy, is, at St. Louis, fifty-two; Dodge City, thirty-eight; Denver, thirty-eight; Santa Fe, thirty-seven; Prescott, twenty-four. Owing chiefly to local causes there is a slight difference in the rainfall and per cent of cloudiness in different portions of these dry regions. More rain and snow are precipitated in the high than low regions, as indicated by the distribution of vegetation, as well as by the actual record of inches of precipitation. The atmosphere is also more humid and the sky more cloudy on the windward than on the leeward side of mountains standing across the path of rain-bearing winds,

so also valleys are damper than open countries of the same level, and valleys running north and south are more likely to be damper than those running east and west where both sides of the valley are exposed to the rays of the sun. Of all this vast high and dry region Colorado and New Mexico stand unrivaled in their claims for suitable climates for consumptives.

Colorado enjoys the distinction of having the highest general altitude of any of these extremely high and dry States. It also enjoys the distinction of having embraced within its borders several thousand square miles of the highest plains. Denver, standing on the extreme western margin of the great plains, 5,294 feet above the sea, may be considered to fairly represent the climate of Colorado. Here the annual average rainfall is fifteen inches, average temperature 49°, the mean daily range of temperature 24°, mean monthly range of temperature 59°, mean monthly movement of wind 4,580 miles.

Perhaps better results are obtained from a larger number of properly selected tuberculous subjects at Denver and Colorado Springs, a little further south, than at any other places in the United States, if not in the world. But unfortunately many cases are unable to endure the winds and extreme daily variation in the temperature, as is evidenced by the large class of unsuitable cases indicated by the most enthusiastic advocates of this climate, and by the many unfavorable reports of cases who have tried it without benefit, and who afterward were greatly benefited or entirely cured in less high, cold, variable climates. But in avoiding such extremes the fatal mistake should not be made of selecting warmer and moister localities, but rather warmer but still high and dry localities should be selected. Colorado Springs is a little further south than Denver and possesses some advantages over the latter place in having some protection from the wind; and the parks and plateaus and deep canons further west possess some

advantages, especially in winter, over either Denver or Colorado Springs.

New Mexico possesses many advantages over Colorado in that it has about the same high altitude and cold variable climate in the northern portion of the State as Colorado and a much lower altitude and warmer climate in the southern portion of the State. Taken as a whole, it is one of the dryest, if not the very dryest State in the Union. The annual average rainfall does not exceed ten to twelve inches. On an average not more than twenty-five or thirty cloudy days are recorded during the whole year. At Santa Fé the average annual temperature is 48°, mean daily range of temperature 34°, average annual rainfall 14 inches. At La Mesilla, in the extreme southern part of the State, the annual average temperature is 63°, the mean daily range of temperature 34°, the average annual rainfall 8 inches. The Rio Grande River falls three thousand five hundred feet from the time it enters the northern till it leaves the southern border into Mexico. On account of this difference in the altitude and temperature of different portions of the State many patients, who would be excluded from Colorado and Northern New Mexico, can do well, especially during the winter season, in extreme Northwestern Texas, about El Paso, 3,800 feet above the sea, and at various points in the Pecos Valley in Eastern New Mexico, at Seldon or La Mesilla, four to seven thousand feet above the sea, in Southern New Mexico, or in the vicinity of Silver City in Southwest New Mexico. Indeed, most patients from southern and temperate climates would do well at one of these places, especially El Paso, Texas, before going to the higher and cooler regions of Northern New Mexico or Colorado. Southeast of Silver City stretches a beautiful plateau fifty miles long by forty miles wide, itself four to five thousand feet above the sea, and almost surrounded by mountain ranges and peaks which shelter it from disagreeable winds. From here the patients, if desired, can go by degrees to the

higher, colder climate of Northern New Mexico, or even to Colorado. But Santa Fé or Las Vegas Hot Springs will furnish about all the good there is to be found in such high, dry, cold climates. In no part of the State does vegetation rot, but dries up; meats do not decompose, on account of the absence of moisture. Asthma and hay-fever are unknown among the natives, and a vast majority of cases of incipient tuberculosis are cured entirely by a sojourn here of from six months to three years.

Eastern Arizona possesses many of the advantages of New Mexico, but toward the south and west the elevation above the sea is only slight, and the climate is too warm to be agreeable. Many localities west of the Sierra Nevadas, Santa Barbara, Los Angeles, San Diego, and Pasadena are noted health resorts. Many favorable reports of results come from this region, especially from localities at high elevations, but it is generally conceded that better results are obtained at the inland than at the coast resorts. While good results are obtained in Wyoming and Utah, and even in Montana, and still farther east and south on the plains, yet Colorado and New Mexico, especially the latter, and still more especially extreme Northwestern Texas and Southern and Western New Mexico possess the most advantages for tuberculous subjects.

The chief claim for the latter places are, (*a*) that they possess positively curative influences nearly or quite equal to that of the climate of higher and colder regions without many of their objectionable features; (*b*) many patients included in the unsuitable list for the higher bear the climate of these lower regions well, and often recover after a sojourn here of from six months to three years; (*c*) fewer mistakes are likely to be made in sending promiscuously cases there than to places with such a large list of exclusions. The most suitable American climate may be included in the nine degrees lying between the 31st and 40th parallels north latitude and the nine

degrees lying between the 101st and 110th meridian west longitude.

The principal disadvantages of these lower regions are the rapidly moving waves of wind and the large amount of sand that gathers and floats with these winds. But these winds are no worse, and, except at certain seasons, are not even so severe as in Colorado; the changes in the temperature are not more sudden, and are not even so severe as in Colorado, besides cyclones seldom or never occur there. Sand is not so bad, except in large towns and in cultivated districts exposed to the winds, while most of the health resorts are protected by hills and mountains from the winds and their accompanying sand, and consequently have less to contend with from those evils.

As a general rule, persons suffering from valvular lesions, rapid action of the heart, emphysema, pneumonia, pneumo-hydro-thorax, "existing hemoptysis," advancing bronchi ectasis, hypersensibility of the nervous system, double cavities, pyrexia, great debility or advanced age should not go to the higher altitudes. Yet many such persons do well in the highest, coldest portions of the central Rocky Mountain regions, but many of these will do better in the lower, warmer, drier sections referred to. Unless hemoptysis actually exists such cases usually do well at moderately high altitudes, from the fact that the conditions which give rise to hemoptysis are rapidly relieved. Many cases of valvular disease and many cases of apparently hopeless pulmonary tuberculosis do well at high altitudes, yet great care should be exercised in the selection of such cases. But cases of incipient tuberculosis do the best, and from this class most recoveries are recorded. Patients with constant, continued fever, great debility, and advanced age should strictly avoid high altitudes.

PREVENTION AND TREATMENT OF PULMONARY TUBERCULOSIS.

By T. B. Greenley, M. D.
Meadow Lawn, Ky.

In writing on this subject it would be a work of superfluity to describe the symptoms or to speak of its pathology, as it is so prevalent that all physicians are conversant with them.

It has been the observation of the writer for many years that the majority of cases of this disease are preceded by a longer or shorter period of impaired health, apparently due to indigestion and deficient assimilation. Especially is this condition presented in those who are constitutionally predisposed to the disease. It is the opinion of the writer that if proper means were instituted to restore these cases to their ordinary health that the disease in a majority of them might be prevented. The means indicated in these cases consist mainly in the use of proper diet and exercise in the open air, observing at the same time sanitary environment. We all are familiar with what difficulty in many instances we have in the selection of proper aliment, each case being virtually a law unto itself. But, as a rule, we can soon by experiment learn what kind of diet is most suitable or adapted to each individual. We can usually procure proper digestion and assimilation by the aid of agents at our command. It may be necessary to promote the appetite in some cases where it is deficient. In selecting a diet for a patient who is troubled with deficient appetite and digestion we should have regard to the constituent principles, such as possess due proportions of hydro-carbons and proteids or nitrogenous elements. If

the patient can digest unskimmed milk, it will meet most of the requirements of the system. Most persons can soon acquire a fondness for this article of diet, and if necessary can aid its digestion by peptonizing agents. If pure cow's milk should not agree with the patient, some preparation of it might be tried.

Some recommend meat diet, especially beefsteak. In some instances it will be necessary to aid the appetite by the use of tonics, such as small doses of nux vomica, gentian, etc., as well as alteratives, as some of the preparations of hypophosphites. These will also aid digestion. For this purpose I have found the normal liquid of nux vomica given a few minutes before eating the best.

Independent of healthy cell action it is impossible to have healthy nutrition of the tissues or proper metabolism and excretion. These functions are always impaired to a greater or less degree in the commencement of tuberculosis, or, in fact, almost any chronic constitutional disease. The peculiar cachexia of these diseases are generally apparent to the observation of the physician. Now the only way to prevent these low conditions of the system, or to restore the patient to health after they occur, is the use of proper alimentation, such as will promote healthy cellular and metabolic action. It may be said that where these functions are in a natural or healthy condition tuberculosis can not take place or exist.

As to the treatment of pulmonary consumption, a great deal, in its early stages, can be accomplished by the use of proper alimentation. Of course there are many adjuncts to this plan which must be strictly observed in its its management, such as sanitary surroundings and proper amount of physical exercise in the open air.

In treating such cases a great many things of a minor character will suggest themselves to the physician for the benefit of the patient which are not necessary to be mentioned in a short paper like the present.

In cases of the character of those under consideration Dr. Dennison, of Colorado, lays great stress on proper diet and exercise, and believes many are cured by these means alone. Of course, in taking exercise it must not be carried to fatigue, but be practiced in accordance with the strength of the patient.

Prudence must also be exercised in the selection of the diet and its consumption, securing that which is most digestible and nutritious. Dr. Dennison seems to favor partially cooked and scraped beefsteak as a nutritious element of diet, and is of opinion that it is usually managed by the stomach better than most any kind of meats. As to the fat-producing elements, we get a sufficient quantity in the starchy portions of diet.

It is thought by many that bread made of Graham flour, or that containing more of the nitrogenous element of the wheat than we get in the white flour, is more digestible and at the same time more nutritious.

Of course in many instances in the management of cases of the character of those under consideration it is necessary to give some remedial agents according to indications. A great many plans of treatment and remedies have been suggested and put into practice, but unfortunately the most of them have proved to be mere fads, and of an evanescent character. We have had the cabinet or compressed-air treatment, the Burgeon method, the tuberculin plan, the creosote and iodine plans, etc.

There are a few practitioners who still believe good can be produced by the use of tuberculin. I had the pleasure of meeting Dr. Dennison, of Denver, at the late meeting of the American Medical Association, and in a conversation with him on the subject he remarked that in very minute portions he believed good could be accomplished with it.

We now have before us a few more so-called remedies for this prevalent and destructive disease. Dr. Carasso, of Genoa, has lately published his plan of treatment, and claims great

success. His method is as follows: A piece of linen cloth, ten centimeters square, is folded to make a pad five centimeters by two centimeters. By means of tapes this pad is secured in contact with the nostrils. The tapes may be tied around the head, about the ears, or to the frames of a pair of spectacles. The pad is to be worn day and night, and only to be removed at meal-times. In cases of patients with outdoor occupations who object to wearing this inhaler for cosmetic reasons, a quill tooth-pick or cigarette-holder may be stuffed with cotton and, after saturation with the mint essence, may be used as a mouth inhaler. The inhaling pad is to be moistened with five or six drops of peppermint essence four or five times a day. The nostrils are to be greased with vaseline for the first few days to prevent irritation. The patient is instructed to take eight or ten deep inspirations with closed mouth, retaining the air as long as possible. After ten or fifteen minutes rest this procedure is repeated, and so on through the day. In case difficulty is experienced in keeping the pads in position at night, the bed pillow may be impregnated with ten or fifteen drops of the mint essence.

The following mixture is given internally:

Creosote, pure (beechwood),	8.00
Alcohol,	550.00
Glycerine,	250.00
Chloroform,	20.00
Essentiæ menthæ,	8.00

"Of this mixture take a teaspoonful every three hours in a glass half full of water. In certain cases the mixture may be further diluted with sweetened water, or the dose may be reduced.

"The nutrition is favored by the method of overfeeding. Two or three liters of sterilized or boiled milk are given daily, together with plenty of meat cooked to taste, and with the addition of 400 or 500 grams of good wine. The patients are

instructed to carefully disinfect their expectoration, thus preventing re-infection.

"In all the cases subjected to this plan of treatment the diagnosis was confirmed by finding the tubercle bacilli in the sputum. Many of the cases were well advanced in the disease, though no record is made of cases in which the lung destruction had advanced to the formation of cavities recognizable by physical examination.

"In all forty-four cases are recorded. Of these there were six deaths, and thirty-eight recoveries. Of the fatal cases, five were subjected to autopsy, and four exhibited either general miliary tuberculosis or intestinal and peritoneal tuberculosis along with the lung disease. In one fatal case the patient, after once having the disease subdued, returned to her poor surroundings and suffered a fatal relapse without again submitting to treatment. In another case of well-advanced phthisis the patient died of capillary bronchitis soon after beginning the treatment."

From the record it appears that every case of primary tuberculosis treated by the inhalation method of Carasso recovered, and that the fatal cases with two exceptions were ones in which secondary tubercular lesions produced death. The average duration of the treatment in these cases was sixty days.

The regularity of improvement in these recorded cases is striking. The fever, cough, and night-sweats rapidly diminished, and ultimately disappeared. The bacilli in the sputum began to diminish in ten days, and all disappeared in sixty days; while the expectoration became at first mucoid, and finally ceased. The weakness, loss of appetite, and emaciation rapidly improved. The recovery in all the cases seems to have been permanent.

"The simplicity and harmlessness of this treatment of Carasso, together with the remarkably successful outcome of his cases, recommends the method for a thorough and systematic clinical test."

The details of the foregoing plan of treatment, with its reported success, would tend greatly to stimulate us to hope that an important discovery had been made in the management of consumption by Carasso, but when we come to think of the many plans of treating this disease which have been inaugurated within the last decade with vaunted claims of success, and have all proved to be useless, our faith in any new plan is rendered somewhat weak.

Dr. Carl von Ruck, of Asheville, N. C., has derived great benefit in many cases of chronic tuberculosis of the lungs by the varied use of hydrotherapy. He claims the cold rub, shower bath, or full cold bath, or a combination of them greatly promotes the nutritive processes. "The cold rub is given in bed, using water at a temperature of 90° F., which is applied quickly and in succession to the arms, the chest, the lower extremities, and lastly to the back. Each part, after the water is applied, is quickly dried and vigorously rubbed with a coarse bath towel until a gentle glow of the skin is produced. The whole proceeding requires less than five minutes, unless on account of slow reaction prolonged friction is necessary. Every two or three days the water is used several degrees cooler until a temperature of 50° F. is reached, the rapidity of reduction in temperature depending upon the readiness of reaction of the peripheral circulation. Every patient, unless suffering at the time from pulmonary hemorrhage, is a proper subject for the cold rub."

He also omits the application of cold during menstruation. Dr. von Ruck has also found benefit from the use of the same therapy in cases of hectic fever. But the bath or cold rub must be used only after reaction from the chill. He claims this plan of treatment improves the appetite and digestion, as well as renders the patient quite comfortable. He thinks the use of cold water in this way controls the access of temperature better than the use of antipyretics and with greater safety to the patient.

Dr. Marston reports several cases of phthisis cured by inhalation of the fumes of acetic acid. In the absence of the acid fermented fruit juice of any kind will subserve the same purpose. He regards it as a germicide, as well as an alterative on the lung tissue involved. He expresses great confidence in its therapeutic virtues.

Dr. Parsons, of the Times and Register, has recently published a monograph entitled "A Practical Theory and Treatment of Pulmonary Tuberculosis." He claims the disease to be curable, and recommends oxygenation by hydrozone and glycozone, combined with climatic influences, hygiene, exercise, diet of carbo-hydrates, etc. It is printed in form of a serial in the New England Medical Monthly. His plan seems to be quite plausible as well as logical.

We now come to speak of about the last boasted remedy, to wit, antiphthisin or immunized blood serum, first brought into notice by Dr. Paquin, of St. Louis. His plan is fully elaborated in a paper read before the St. Louis Medical Society in February last, and of course is based on the antitoxin theory of treating microbic diseases. This paper is published in the Journal of the American Association of March 9, 1895. He, together with his friend, Dr. Cale, were permitted to experiment on patients in the city hospital and almshouse, and they report the results very carefully in twenty-four cases, as follows: Two in the first stage, fifteen in the second, and seven in the third stage. He commenced the treatment about December 1, 1894, and continued it up to February 1st, about eight weeks, when he made his report.

The improvement made in such a short time, under all the circumstances, is wonderful. Notwithstanding that some of the patients were brought into the institution on stretchers, and subjected to ordinary hospital diet and attention, as well as perhaps the want of proper sanitary surroundings, especially those in the poor-house, they all made great improvement in strength and general symptoms. All but two

gained in weight, and these improved in every other way. Their cough and expectoration diminished, fever abated, appetite improved, and the breathing capacity increased.

But, as he states, the short time these patients were under treatment, notwithstanding their great improvement, affords no positive evidence of their final cure. He is of the opinion that it will require from six to twelve months to effect a final cure, depending on the progress the disease has made in individual cases. He is very sanguine, however, in effecting cures in a large majority of cases, especially those uncomplicated with other ailments.

To read the report of Dr. Paquin's success in the treatment of these twenty-four cases of consumption almost induces us to believe that the day of miracles, witchcraft, and wonders had returned; and, had not so many recent fads in medicine proved so fallacious and evanescent, we might be inspired with hope that something had been discovered to greatly relieve the suffering and diminish the mortality of the human race.

Dr. Paquin does not state the technique of immunizing the horse, but will do so hereafter. He only remarks that it requires several months to effect it perfectly. It is presumed that it is done by injecting the toxin of tuberculosis as practiced in obtaining the antitoxin of diphtheria. The word immunizing would seem to be inappropriate in both tuberculosis and diphtheria, as one attack does not protect from subsequent attacks in either disease.

Dr. Ingraham, of Binghamton, N. Y., has published a report (See Journal American Medical Association, May 4, 1895,) of some nine cases of tuberculosis in which he used the blood serum of a healthy mule without immunizing him with toxin. The only good effect he noticed resulting from its use was reduction of fever in those cases accompanied with pyrexia. One dose of the serum would abate the fever forty-eight hours or more. There was no beneficial effect in

any other particular; but, on the other hand, there was a manifestation of unpleasant symptoms produced by the serum. In small doses, as well as large, an eruption would result within three to seven days, and persist several days after. Fever usually accompanied the eruption. He also noticed that if he used more than a drachm at a dose, severe pain, usually at the site of injection, would result. These untoward symptoms he maintains could not have resulted from any fault in the preparation of the serum, as every precaution was observed in its production.

He believes the unpleasant symptoms produced owe their cause to the inherent properties of the serum of the blood.

Dr. Paquin read a paper on the use of blood serum from the horse at the late meeting of the American Medical Association, being a second report of his cases above treated of. He not only confirms his first report, but goes on to state that his patients continue to improve, and more than half of them are well and discharged from the hospital and gone to work. Not one of those reported first died, and all those remaining in the institution are still improving in every particular. This is the more astonishing when we consider that they included cases in all three stages of the disease, and some even had to be taken to the hospital on stretchers. He does not particularize the mode of immunizing the horse, only says that he injects him with the toxin of the bacilli.

In discussing the paper Dr. von Ruck seemed to doubt the success of the treatment as stated by Dr. Paquin. The doctor, however, maintained his ground, and made a comparison of the results of his treatment and that ordinarily in vogue. He stated that among the patients in the wards adjoining his many died during the period of his treatment, from December 1st to April 15th, while he lost none.

Dr. Rochester, of Buffalo, also read a paper at the late meeting of the Association, in which he reports the treatment of thirty-four cases on the Carasso plan. These patients

were in the Erie County Hospital at Buffalo. At the expiration of two months the patients were growing so much worse he had to abandon the plan, except the inhalation of the essence of mint. He thinks the medicine for internal use is too irritating to the stomach, and that the amount of food, etc., used by Carasso is entirely too great for the management of that organ.

Dr. Amos, of Baltimore, in discussing Dr. Rochester's paper, remarked that his experience in Dr. Carasso's plan of treatment was very similar to that of Dr. Rochester. He treated sixty cases of out-door patients at the Johns Hopkins Hospital, and did not notice any special benefit resulting, except in one case. He remarked that it was impossible to give due attention to many of this class of patients.

Perhaps the most rational, as well as the truly hopeful plan of managing pulmonary tuberculosis, as might be said, is before it is fully developed. Preventive means are much better than curative, but both combined, in some cases, are better than either alone in order to prevent further development.

Now, in closing this short and imperfect paper, I would remark that it is my firm and settled opinion that a great deal of good may be accomplished in the use of preventive means as herein outlined. Of course I am speaking of cases not suddenly induced, as those following an attack of measles, pneumonia, or bronchitis, but those preceded by a slow but general giving way of the functions of digestion and assimilation. We now have many agents by which we can restore these functions and at the same time not neglect any hygienic conditions essential in such cases. And all that can be said in the way of preventive means can, with prudence, be called into use in the management of the disease according to the physical condition of each individual case.

DISCUSSION.

DR. CARL WEIDNER, Louisville: In the paper that has been read by Dr. Greenley we have not only received a rare treat, but it has shown us that a medical man never gets old. The doctor is an exemplification of that fact. He has given us the treatment of pulmonary tuberculosis up to date. I have very little to say except to indorse what he has said. Our chief indication and main object, so far as we know to-day, may be summed up in these words, to increase the vital resistance of the tissues and cells; for what we know of infectious diseases to-day, that is, the underlying basis and the method of healing, depends entirely upon this one factor, the vitality of the cell. Without that we have no remedy to cure these affections. For that reason the treatment ought to be preventive. I shall not mention destruction of bacilli, but I speak of preventive measures, of toning up the tissues by hygienic measures and by climatic influences. Unfortunately in many cases we can not do that. Our patients can not go to the most suitable climates, and therefore we must do the best we can for them with medical treatment. I believe in the combined efficacy of these three factors.

As to the special treatment mentioned, I shall say nothing except to call attention to one form of treatment which Dr. Greenley mentioned. I refer to the serum treatment advised by Dr. Paul Paquin. I do not know the mode of its action, nor the method of its preparation. I understand he has satisfactorily treated several patients with it, some of them being over forty-five years of age. I do not know how the serum acts.

There is a new remedy, not mentioned, with which possibly some of you have been made familiar through the newspapers. I refer to pilocarpine injections, as advocated by Wahlstein, who has made repeated experiments with this remedy, which has been used for other purposes for a long time. He has noticed that when it is used in connection with the Behring serum, and without the serum, there was a peculiar change in relationship and in the number of the white cells in the blood; that after the injection of the serum there is an increase in the polynuclear leucocytes which we observe in other infectious diseases.

DR. GREENLEY (closing the discussion): In relation to the use of pilocarpine, I can readily understand how great benefit might accrue from it in individual cases where there is total inactivity of the skin. It is a great diaphoretic, and it might excite the action of the skin, and thus aid in removing effete material from the system.

THE LEUCOCYTES IN DISEASES OF MICROBIC ORIGIN.

By F. M. Greene, M. D.
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The older physician explained the etiology of diseases generally by the use of the term "*materies morbi*," of which they had no very definite idea, believing that it represented certain poisons emanating from the earth and conveyed to the system through the medium of the atmosphere, water, or food.

They were aware also that the system under certain circumstances had the power to resist disease, also of performing cures unaided by the efforts of the physician. This idea was expressed in the often-quoted aphorism, "*vis medicatrix naturæ*."

It was reserved for the modern science of bacteriology to show that the "*materies morbi*" are really living germs, which on entering the system become pathogenic in character; also that the power to cure resides really in the white corpuscles of the blood (leucocytes). When engaged in this important work they are called phagocytes. Before entering upon the discussion of the wonderful process of phagocytosis it will be proper to dwell for a short time upon the peculiar nature of the leucocytes themselves. The blood is described as a whole, as a definite, living tissue, its corpuscular element presenting by far the most interesting feature for the study of the bacteriologist. In numbers the white corpuscles of the blood (leucocytes) rank far below the red (erythrocytes.) The proportion in health has been estimated as 5,000 of the former to 5,000,000 of the latter per each cubic millimeter by measurement; more definitely, 1 to 300. This proportion remains

pretty constant in ordinary conditions of health but is subject to great variation in disease, and each living cell is doubtless destined to fulfill definite vital functions.

Until recently the red corpuscles were given first place in the economy, being regarded as the oxygen carriers to the general system, and giving vitality to the various tissues and organs of the body, while the leucocytes from their inferiority in numbers took second place. Under the microscope the leucocytes were observed to possess certain characteristics not seen in the red, a protoplasmic contractility or ameboid movement enabling them to perform wonderful feats. A classification of leucocytes has not proven satisfactory. Bacteriologists recognize four varieties: (1) Non-nucleated leucocytes, smaller than the red, and with quiescent protoplasm. (2) Leucocytes about the same size of the red corpuscles, usually showing only one nucleus and decided ameboid movement. (3) Polynucleated lymphocytes, larger than the red, and each nucleus showing one or more nucleoli. These are supposed to act principally as phagocytes, and show active contractility. (4) Eosinophalous cells, so called from their readiness to become stained by eosin, and which some think originate in the spleen. Metschnikoff showed, in a series of interesting experiments, that the leucocytes possessed a decided attractive force toward the proteins, constituting the body of the vegetable parasites known as bacilli. This force or attraction is termed chemotaxis, and is manifest between the ultimate molecules of both animal and vegetable matter. As early as 1824 Detrochet pointed out the fact that the leucocytes in their wanderings (ameboid movement) absolutely penetrated and passed through the walls of blood-vessels. For many years this fact was noted without comment. More recently Virchow, Cohnheim, and many other scientists and bacteriologists studied this wonderful power of the leucocytes with the greatest interest, and it was called diapedesis. It is an interesting problem in physics to determine precisely in what

manner they penetrate the walls of the capillaries and blood-vessels. By some it has been ascribed to paralysis from over-distension, by others to molecular change or alteration in the walls themselves.

It would seem more readily accounted for when we take in consideration their own independent movement and contractile power by which they wander from place to place. Their migrations must therefore be due in a great measure to active effort on their own part.

At the *locis lesionis*, or place of entrance of bacteria, they are attracted in great numbers and for a definite purpose, the destruction of pathogenic germs which have entered the system, whether through traumatism upon the external surface, the skin, or the mucous membrane lining the internal passages; these are the usual sources of entrance of bacteria. Julius Cohnheim's experiments upon the frog's mesentery apprise us fully of the vascular changes and disturbances connected with active inflammation. We have, first, dilatation of the blood-vessels, there is a more rapid flow of blood through them; "sooner or later the speed diminishes, and at length the current becomes slower than normal." The leucocytes were now observed to leave the axial current and arrange themselves along the periphery of the vessels; they seem to be sticking to the sides of the vessels. By their own inherent power they pass through the walls (diapedesis) and are found in great numbers among the tissues. At the same time there is effusion of liquor sanguinis (coagulable lymph). During the intense hyperemia and congestion many of the red corpuscles also escape. In all inflammations caused by the entrance of bacteria, we have both rapid growth of the pathogenic germs and increase of leucocytes, which is observed in all forms of inflammatory type, and which has been termed inflammatory leucocytosis.

Increase of leucocytes has been frequently observed in certain affections which can not be called strictly patholog-

ical, soon after the ingestion of food, especially of an albuminous character, in the very young, and in pregnancy, especially with primiparæ.

When there is demand for repair or growth, or necessity for defense against the inroads of bacteria, there is a corresponding increase in the white corpuscles.

In certain derangements of the blood, as in anemia, chlorosis, and leukemia, we have increase of leucocytes, but at the same time diminution of the red corpuscles. In the grave forms of progressive pernicious anemia and in Hodgkin's disease there is doubtless disease of the absorbent glands themselves.

The subject of hematogenesis is one of great interest to the physiologist, and it has never been determined what are really the hematopoietic organs of the body. Virchow believes that the larger lymphocytes originate in the spleen. His definition of leucocytosis, however, is "a transitory increase of the white corpuscles owing to an irritation of the lymphatic glands." Again, they have been ascribed to the spinal marrow. That the absorbent glands are the principal agents in the genesis of blood is more than probable. After digestion has been completed and the food converted into chyle, it passes through the absorbents, which further elaborate it before it is conveyed by means of the thoracic duct to the general circulation. We have no evidence that the corpuscular element appears in the blood until it has circulated in the larger blood-vessels.

In illustration of the rôle played by the leucocytes in disease, we select two common affections with which you are all familiar, croupous pneumonia and typhus abdominalis. The pneumo-bacillus of Friedlander is now regarded as the cause of this form of pneumonia. It is found in the mouth and fauces of healthy individuals, and in the blood and secretions of patients laboring under the disease. Sudden in attack, it is ushered in by a rigor of greater or less severity.

Its three stages of inflammatory engorgement, hepatization, and purulent infiltration, are usually well marked.

There must be a lesion of the epithelial layer of the mucous membrane lining the alveoli and air vesicles of the lungs before the bacillus may find entrance and place suitable to its growth and propagation. This is furnished in the plasma of the blood. We may readily account for such lesion by exposure to sudden changes of temperature, traumatism, caused by noxious and irritating gases, violent exertion, overwork, exhaustion. The bacilli now multiply rapidly and enormously. The same process is set up in the lung tissue as is observed in inflammation in other parts. There is a rush of leucocytes to the *locis lesionis*, to which they are attracted by the bacilli. They pass through the walls of blood-vessels, and their work of destruction begins (phagocytosis). The crisis in this disease usually occurs from the fifth to the seventh day, and when the leucocytes are victorious there is sometimes a rapid return to health before the suppurative stage has set in. We do not always witness so happy a termination in the disease, for the leucocytes may themselves be overcome, and a toxin or ptomaine is formed which proves rapidly destructive of the blood itself.

Reider found in the examination of the blood early in the attack a decided increase of polynucleated leucocytes, which are regarded as the principal agents in the destruction of bacteria, also that in lethal cases of the disease they were either greatly reduced in numbers or entirely absent. This was especially observed in senile pneumonia which is always attended with great mortality. In the aged the work of the bacilli go silently on with little disturbance of the general system. We have only the physical signs to guide us, as hurried respiration, dullness on percussion, and cyanosis. The temperature and also the pulse may be normal or even subnormal, indicating failure of the vital forces. The microscope may aid us in diagnosis by detecting the bacilli in the sputa in its earlier

stages, and also in prognosis by showing a total absence of these important elements of the blood.

Taking this view of the etiology of this disease, it follows that in its treatment the old-time remedies, venesection, tartar emetic, digitalis, and veratrine, must be regarded as preposterous therapy. The older physicians believed that the disease resulted from chilling of the body, by which the blood was driven to the lungs, causing inflammation, accordingly the first step in treatment immediately after the rigor was venesection to relieve this engorgement. They regarded chilling of the surface a "*conditio sine qua non*" in pneumonia. Many of you remember the heroic treatment of the older masters in this disease.

Bennet, of Edinburgh, not many years since, proved that a far less mortality attended the disease under the expectant and stimulating plan, with proper hygienic measures.

Classing pneumonia among infectious diseases Juergensen says: "Nature cures; and the only duty of the physician is to maintain life until the cure is effected." The greatest danger arises from paralysis of the heart, not from overdistension or congestion, but from the effects of a toxin generated by the bacilli.

There must be two principal indications for treatment in all diseases of microbic origin. First, to destroy their germs as soon after invasion as possible and at their point of entrance (*locis lesionis*); secondly, to overcome the effects of toxines after they have been formed.

Up to the present time, as far as known, there are no remedies which, when taken into the lungs by inhalation, have proven bactericidal, and our efforts therefore must be directed toward the promotion of leucocytosis. There have been many attempts at intravascular disinfection by remedies which have been absorbed into the general circulation. Bintz claimed that in certain intestinal affections calomel proved curative, and that in its passage through the alimentary

canal it was converted into the bichloride, which was proven to be one of our best and most effective bactericides. Winternitz claimed that guaiacol, the active principle of creosote, was curative of phthisis in its earlier stages, and recent reports of the remedy when applied early to the throats of patients laboring under diphtheria have been more than flattering. The recent discovery of Behring's blood serum (antitoxin), which has proven so successful in the treatment of diphtheria, opens up a wide field for investigation, and similar experiments are being made with cultures of the pneumonia bacillus, also that of Eberth, and of that producing tetanus.

With the advocates of leucocytosis it yet remains an open question whether the blood serum thus obtained from cultures of virulent bacilli by repeated inoculation into the blood of the horse, may not so modify and change the white corpuscles as to enable them to successfully resist not only an invasion of bacteria, but also to destroy the toxin already formed. It was doubtless upon this principle that Jenner's great discovery of the vaccine virus so acted upon the corpuscles as to enable them to resist variola.

Experiments have shown that the application of cold water to the surface externally is a powerful means of increasing leucocytosis. Juergensen, Ziemssen, and many German writers boldly advocate the application of cold water in the treatment of pneumonia. The application is to be made either by the cold pack, ice to the chest, or the immersion bath. In the hands of the former it proved the most successful treatment of the disease. It is doubtless one of the safest and most effective antipyretics known to the profession of the present day. Many of the coal-tar derivatives have proven heart depressants, and are unsuitable in pneumonia. In typhoid fever we have a disease directly opposite to pneumonia in its mode of invasion. The Eberth bacillus chooses the glands of the ileum as its point of attack, and is doubtless conveyed within the system by food or water which we

drink. In this disease there must be a *locis lesionis* as in diphtheria and pneumonia. The premonitory stage is long and very obscure. The disease is sometimes attended with so little pyrexia and disturbance as to render the diagnosis extremely doubtful. Walking cases are observed and may prove fatal without the apprehension of danger. The distinctive work of the bacilli may go silently on unobserved until hemorrhage or perforation announces the gravest symptoms. The leucocytes bravely rush to the rescue, but are overcome and poisoned *en masse* in the absorbent glands of the bowels.

The disease is continued over a considerable length of time, and when death is not the immediate result of hemorrhage or perforation, a toxin is formed, septicemic in character, and the brain and great nervous centers give way under the intensity of the poison.

In the treatment of the disease it has been conceded that the hydriatic mode is the most successful. Brand, of Stettin, called attention to the immersion bath as offering the best results from treatment, and until recently it was believed to act simply as an antipyretic. Close observation, however, has proven that here, as in pneumonia, it is a promoter of leucocytosis and acts by stimulating the leucocytes to overcome the bacilli before they have had time to commit their ravages upon the blood. It has been the opinion of the profession up to the present time, that the disease will run a prescribed course uninfluenced by remedies. From the nature of the affection any improvement in treatment must be along the line of intestinal disinfection.

Dr. Woodbridge, of Youngstown, Ohio, made the announcement some time ago, that by the use of certain remedies, by intestinal antisepsis, we could abort the disease within ten days after its invasion. Many have spoken favorably of the treatment, but not as enthusiastically as its originator. The treatment, being opposed by the views of the profession gen-

erally, lacks confirmation, and will require a more critical examination before it can be generally adopted.

Medicine is a progressive science, and we are on the eve of revolutions in therapeutics. The microscope is yet to reveal many secrets in germ life, also in the life-history of the leucocyte. Doubtless the hidden mysteries of both heredity and immunity are to be found in the wonderful history of the white corpuscle. The evolution of life itself and of the individual begins in a single cell or cytoblast. This cell inherits alike the strength or weakness of parent cells of previous generations.

A FEW CRUMBS ABOUT TYPHOID FEVER.

By J. N. Baughman, M. D.
Flat Lick, Ky.

The title of this paper, "A Few Crumbs About Typhoid Fever," will be strictly adhered to, for it would be asking too much of this Society to expect them to listen to a paper going into all the minutiæ of a disease that is so prevalent in all portions of the globe as to call for the earnest thought of every intelligent physician who is supposed to know all that is to be learned in our text-books in regard to this disease.

It shall be my aim to bring to the notice of the Society more especially the diagnosis, prognosis, and treatment of typhoid fever, for it is now universally conceded by the advanced members of our profession that the Eberth bacillus is the potent factor in the causation of typhoid fever, and that Peyer's and the solitary glands of the small intestine are the seat of the trouble or headquarters from which every symptom takes its start.

I am convinced that if we would always be on the alert to prevent the spread of the typhoid bacillus we would have fewer cases and milder ones of this trouble than has been shown by the records of the past. We are too much in the habit of expecting to find all of the typical symptoms of typhoid fever before we write our diagnosis as such, and I feel assured that is the reason, or one of the reasons, why the prognosis in all our text-books is so grave. We are told that in every case of typhoid fever we will be able to make our diagnosis by its gradual development, by the tenderness in the right iliac region, by the tympanitis, by the evening

temperature being from one to two degrees higher than that of the early morning hours, by the rose-colored eruption, by the diarrhea, and on through the entire catalogue of symptoms of the disease, and we look for all of these, and if any of them are absent we say, not typhoid, but common continued fever, when, if we were enabled to examine Peyer's patches, we would find the characteristic congestion in them that is only produced by the ravages of the Eberth bacillus.

In a practice of twenty odd years I have seen quite a large number of cases of typhoid fever, but if I had depended upon seeing the rose-colored eruption before I made my diagnosis I would be forced to record in all this time not one case of typhoid, for while I have always been on the alert for this eruption I have never seen it; but I have in almost every case seen the disease come on insidiously, the patient being up for several days before he is finally compelled to take his bed, and invariably the fever would be from one to two degrees higher in the evening than in the morning. Still I have found this to be the case in nearly all fevers. I have always seen tenderness in the right iliac region, with tympanitis and gurgling. In the great majority of cases we will have diarrhea, but I have seen a few cases where there would be constipation during the entire course of the disease. I am unable to state why this was the case, for all the other symptoms were so plain that it was very clearly typhoid fever, and why we should have constipation in an inflamed intestine is strange—*though strange 'tis true.*

We are told in the text-books that we seldom see a case of typhoid in the very young. I am convinced that in the great majority of cases it is from ten to thirty-five years of age that we see most cases of typhoid fever, but I have seen undoubted cases of this disease in infants.

In all the text-books of thirty, forty, and fifty years ago typhoid fever was considered one of the severest of all the ills flesh was heir to; but, thanks to the advancement of

physic in the last twenty-five years, we now should seldom hear of a death from typhoid fever. This is due to two reasons. The first is because we diagnose as typhoid fever all the cases that would indicate from the symptoms, such as tympanitis, iliac tenderness, gurgling, diarrhea, slow development, and the difference between the morning and evening temperature, with epistaxis in many cases, that we have typhoid, and not to only consider as typhoid fever the typical cases that have all of the symptoms of the disease. The second reason for the decreased mortality is from the great advancement in our therapeutics, which overshadows in this disease even our diagnosis. I firmly believe the time will come when we will scarcely ever hear of a death from typhoid fever, but I am not so enthusiastic as Dr. Woodbridge, of Youngstown, Ohio, who says we should never under any circumstances have a death from it. When we have made our diagnosis as typhoid we should do like the commander of a war ship: prepare for action, clear the deck, furl the sails, and get our vessel in first-class fighting condition by the liberal use of soap and water, to have our patient strictly clean, to have fresh, clean linen upon the patient and bed, to have the room in which our fight is to be made in as cleanly a condition as possible, which, unfortunately, is often one of the greatest obstacles with which we have to contend. By all means the room where our patient is placed should have an abundance of fresh air and the benefit of every ray of sunshine that can possibly be obtained; make every thing as cheerful and pleasant as possible, and then, if we can only be blessed with a competent nurse, the battle is half won. But unfortunately it is a very rare thing to obtain a perfectly reliable nurse in private practice, one who has the ability and the moral courage to carry out the physician's every instruction. In a hospital it is easy enough to have all our directions scrupulously followed, but in private practice, where most of us see all of our patients, we have to take one

of the family, and at times two or three neighbors, who are beset by the whims of the patient and the suggestions of his or her friends.

The next most important thing for us to do when we are called to see a typhoid fever case is to be sure that we leave no stone unturned toward only having the one case in that family. This can be done in almost all, if not in every case, by strict cleanliness and having the dejecta from our patient buried in fresh earth, and also by disinfecting it with lime, which may be procured at any farmhouse. We should never neglect the precaution of placing the evacuation where there is no possible chance for it to get into a cistern, well, spring, or in any way be communicated into the alimentary canal of any one. It is almost criminal negligence upon the part of the practitioner who neglects to carry out all of these precautions, and to impress upon every one the fact that the only way in which typhoid fever is contagious from one person to another is from the excreta of the patient in some way, often mysterious, getting a foothold in the glands of the small intestine, which furnishes such prolific soil for the typhoid bacillus that a single one can in a few days infect the entire system.

It is seldom that we see a case of this disease until at least one or two days after it has been confined to the bed, and by this time the typhoid poison has usually been in active operation for at least seven or eight days. It is very rare for one to be able to give a positive diagnosis of typhoid fever at his first visit, but when I suspect it to be such, it is my usual custom as a precautionary measure to give five to ten grains of calomel to clear out the alimentary canal, to get the liver into proper action, and to place all the secretions in condition to be prepared for the part they are to play during the progress of the disease. The temperature should never be allowed to go above 103° or 103.5° F., for nothing will bring the patient to the brink of the fatal precipice faster than a continuance

of high fever. Undoubtedly the best antipyretic we have is cold water, which, when properly used, is our great sheet anchor in nearly all fevers. The cold bath or wet pack is the best, but in private practice is often hard to have employed for its inconvenience, and often the great opposition to its use by the patient's friends will debar it. I have generally found that sponging the face, body, and limbs with cold water for from five to ten minutes several times a day will keep the fever in due bounds and be very grateful to the sufferer. As an intestinal antipyretic I generally use antifebrine, and while it is said to have some dangers I have never had cause to regret its use. I generally give it in from two- to five-grain doses, repeated often enough to keep the temperature below 103° F. I use quinine for its tonic and antiseptic effect, but not as an antipyretic, for the large doses in which it would have to be given for this effect would injure the patient more than it would do him good. Salol and salicylate of soda I consider the two best internal antiseptics. I use quite an amount of listerine, and also subnit. bismuth, which I give in fifteen-grain doses for its astringent as well as its antiseptic effect upon the ulcerated small intestines. It is my firm belief that if we will get the alimentary canal and all the secretory organs in an active condition and then keep them in an aseptic state by any of our antiseptics, coupled with proper nourishment, we will as readily cure the ulcerated glands of Peyer as we do an ulcerated surface upon the outside of the body. When we have done this, and keep it so, we will find it easy sailing if we will only use caution to look after every symptom. The diet should invariably be of a fluid nature, and of all articles of diet none can compare with milk; but unfortunately we often find that the patient soon finds milk so repugnant that he can not or will not use it. In these cases we often have to tax our resources for a diet that will be retained and at the same time not be injurious. I often give patients soft-boiled

eggs; also strong coffee is often highly relished, and is a splendid antiseptic in the alimentary canal. The milk should always be boiled, for we know milk is a regular hot-house for various kinds of bacteria, and boiling is the best way to render it pure. This liquid, or semi-liquid, diet should be continued until every sign of diarrhea, tenderness, and tympanitis has ceased. It is best to have a liquid diet, for when we say semi-solid it might be construed to mean too much solid, which may be the means of renewing the inflammation in the small intestines that would have gone on to a complete cure by an uninterrupted liquid diet.

During the progress of this disease we often find the tongue becoming dry and cracked and a heavy brown coat upon it, with sordes upon the teeth, great distension of the abdomen, and a parched skin, with coma-vigil and all the symptoms of the low typhoid type. There is no remedy that will so ably help us out in this condition than what was so earnestly urged forty years ago by Dr. George B. Wood, and that is oil of turpentine given in five to ten drop doses every four to six hours. Under this treatment we will usually see the tongue become moist and soft, the tympanitis gradually vanish, and our patient gets sounder and better sleep. It is very rare that I have a case of typhoid fever that I do not see the beneficial effects of turpentine. When using this remedy we must keep a close guard over the urinary organs, and if there should be any signs of strangury at once cease its employment.

During the course of the disease our most devoted attention should be given the heart's action. Death from typhoid fever is more often caused from heart failure than any other cause. If we can keep the pulse at not over 120, and preferably 100 to 110, full and strong, we may not have our picket line so strong, but when we see the pulse going beyond 120 and weak, even if we do not have much fever, we should at once give alcohol in some shape, preferably whisky, and give

it for its effect, which should be closely watched. As a rule we will see the pulse become stronger and slower under its use, and the apex beat of heart can be distinctly heard upon auscultation, when perhaps it could not have been heard before. If this continues we know our stimulant is doing good, and we should continue it, and in doses and at intervals to keep the heart regular and strong. It is impossible to say how much stimulant should be given or how often, for each individual case will be an index unto itself, and the amount should be used to produce the desired effect, be it little or be it much. Right here is where the great importance of an intelligent nurse is wanted, for it is impossible for the physician to be present all the time or to give explicit directions, and if the nurse can not be trusted to use her judgment it were best to let it alone entirely.

Digitalis is an invaluable remedy to give volume and strength to the circulation, and at the same time it acts as a splendid diuretic and antipyretic.

In opium we find one of our most potent remedies in typhoid fever. It relieves pain, produces sleep, and prevents the peristaltic action of the bowel, giving rest to the ulcerated portion, which is so much in need of quiet for the successful granulation to go on to a complete cure. In cases of peritonitis, either local or general, opium is the only remedy upon which we can rely.

Intestinal hemorrhage is to be combated by the use of opiates sufficient to keep the patient perfectly quiet. The use of astringents, I think, are useless, but I invariably give fluid extract ergot in teaspoonful doses every three hours until the hemorrhage has ceased.

Bed-sores should never have to receive any treatment, for they should never be allowed to occur. This is one of the most important points in the treatment of this disease. If it is protracted we should ever be on the lookout for the prevention of bed-sores, by change of position, air or water

pads, sponging the dependent parts with cold water, brandy, camphor, etc. If, unfortunately, bed-sores do occur, they should be treated aseptically and made to heal as rapidly as possible and without suppuration, for the typhoid fever case that has been confined with the disease long enough for bed-sores to appear will always be in such a state of emaciation that he can not bear the loss from any waste.

It is frequently the case that during convalescence from this disease we have obstinate constipation, and we should relieve it by an enema of hot water, and have it pretty well impregnated with boric acid. By the use of Wales' rectal bougie we should be able to inject the entire colon with an antiseptic that may even reach the small intestine through the ileo-cecal valve, even if it is supposed that this is an impassable point in this direction. In any way that we are able to introduce antiseptics into the alimentary canal we should adopt, and from the very first of the disease, for if we can render the alimentary canal aseptic we will cure our patient.

The night-sweats that are so frequent during the course of this disease, and are so exhausting, can be best relieved by hydrochloric acid or elixir of vitriol, which will also help us out in our antiseptic treatment. Strong, cold sage tea is a domestic remedy in these night-sweats that I seldom fail to use, for I have never been able to find any thing to give relief more speedily than this.

Retention of urine should be promptly relieved by the catheter and hot applications to the perineal and pubic regions.

Never feed your typhoid fever patients solid food until all fever, tenderness, tympanites, and diarrhea have ceased, even though he beg, pray, cry, and *cuss* for you to do so. If you yield to his prayers you may kill him.

THE CARE OF THE NEWBORN.

By Henry E. Tuley, A. B., M. D.
Louisville, Ky.

The question of the care and management of newborn children has for so long been relegated to ignorant mothers and nurses, that a consideration of the subject by medical men is opportune. The writer for this reason has chosen for the subject of a paper a few practical points bearing upon the newborn, as well as because too often among the profession there are many who leave all the care, feeding, and clothing of children to those wholly incompetent to undertake the task, without seeking to instruct them as to their duties.

If I shall have impressed a few practical points upon you, chosen from a field necessarily so vast, I will feel well repaid. The taking of the newborn from the hands of the grandmother, with her traditions and superstitions, will meet with strenuous opposition in the majority of instances, but advice must be given upon the points which affect the well-being of our infants, and it is the duty of the physician to see that it is carried out.

Umbilicus. The dressing and care of the umbilical stump is but briefly mentioned by writers upon obstetrics and pediatrics, and it is considered of so little importance as to be left entirely to the care of old women and nurses, whose usual treatment is to dress it with an old greased cloth, in which a hole has been burned for the passage of the stump, the burning according to them seeming to possess special efficacy.

The danger of septicemia threatens every newborn child through the medium of the cord. We know that tetanus,

erysipelas, and diphtheria occur in the young infant, the infecting organism gaining entrance through the cord. According to J. Lewis Smith, "Septic diseases of the newborn can in every case be traced to carelessness or to the dirty dressing of the cord." T. Mitchell Prudden (American System of Obstetrics, Vol. 2, pp. 728–9,) found, in a number of examinations of bodies of children dying at the New York Infant Asylum, that the microscopic examination of the umbilical stump showed great numbers of bacteria in the umbilical vein, and in the surrounding tissues. Nicolaier and Eserich have shown that tetanus nascentium is a traumatic, infectious disease of the navel.

Allen, in the American Journal of Obstetrics, recommends a rather complicated but thoroughly satisfactory treatment of the cord. This consists in the careful application of glycerine to an aseptic umbilical stump, it being frequently renewed.

FIG. 1.

The cord should be tied in two places, about one inch apart, with a strong ligature which has been previously sterilized, extra care being exercised in tying those cords which contain a large amount of Wharton's jelly, as the shrinkage of this may cause the ligature to slip, and a dangerous hemorrhage ensue. An instrument which has recently come to my notice is an Elastic Funis Band Applicator. With it a three-six-

teenth elastic band is placed on the cord, and according to the inventor, Dr. Kellogg, of Wisconsin, accidental hemorrhage is made impossible. The band is stretched by placing it upon the free ends of the closed prongs and compressing the handles. It is then carried over the cord—previously cut—the pressure on the handles is relaxed, and the instrument is readily withdrawn, leaving the band in position.

In a hundred and seventy-six births occurring under my observation, of which I have a record, the average time for the separation of the cord was six days, and in all of these cases, after thorough cleansing, a powder, consisting of boracic acid and salicylic acid in equal parts, was applied to the stump upon sterilized absorbent cotton. At each bath the stump was cleansed and the powder reapplied on a fresh piece of cotton; the stump was then laid upon the abdomen and a snug but not tight binder applied to hold it in position. Under this treatment the stump rapidly mummifies, and there is no moist or fungous navel left. At no other time is a binder of any use, and so soon as the cord separates it should be removed and not replaced. Instead of preventing hernia, as it is taught, the binder is a frequent cause of it, merely by mechanically forcing the abdominal contents down into the pelvis, and I have never seen a binder, no matter how scientifically applied, which will stay in position twelve hours without requiring frequent readjusting. If the child is born during the winter months, the binder which holds the cord can be replaced by a knit binder, which, applied very loosely, merely acts to protect the abdominal contents from cold.

Eyes. The fact that a number of States have passed laws with a view to decreasing the number of cases of blindness due to ophthalmia neonatorum shows in what a light this dreaded but preventable disease is held by progressive States, and it behooves this Society, as the representative medical body of Kentucky, to recommend to our legislative bodies the enactment of laws similar to those existing now in

Missouri, Maryland, and other States, looking to the prevention of blindness in infants. These laws have reference, however, particularly to ophthalmia neonatorum occurring in children who have not had the advantage of medical attention; but it is the duty of every medical man to institute such precautions as may prevent ophthalmia, and in the Credé method we have an efficient preventive remedy. It is true, *ante-partum* ophthalmia neonatorum does exist, and, as has been shown, is but little if any affected by the Credé treatment; but it is of such rarity as to perhaps never be seen by the average practitioner. Friedenwald (Medical News, Vol. lxvi, No. 10,) has been able to collect but eighteen cases from the literature upon the subject.

As the infection generally occurs during the passage of the child's head through the vagina, and the period of incubation is rarely more than twenty-four hours, the instillation of one or two drops of a two-per-cent solution of nitrate of silver into each eye, immediately after birth, will in the great majority of cases suffice to prevent this dread trouble.

That the Credé treatment is effectual, may be instanced the record of the Sloane Maternity Hospital, New York (Mittendorf). In 4,300 births, the mothers being drawn from every walk of life, not a single case of ophthalmia neonatorum developed, the Credé treatment being used in every case. It was the writer's privilege to be present at two hundred of these births, and the rapidity and ease with which this treatment is carried out recommends it for general adoption. Should an excess of the silver solution be used, a little saline solution will suffice to neutralize it.

Feeding. It is hardly necessary to state that, unless some physical condition precludes, all infants should be given nature's food—mother's milk. Immediately after birth the child should be anointed thoroughly with vaseline or olive oil, not with lard, on account of the salt which it contains, then wrapped in a shawl or blanket and laid away for at least

twelve hours before it is bathed and dressed and given to its mother for the first nursing. During the first six hours the cord should be examined frequently for hemorrhage. The danger of subjecting the infant to the double shock from exposure after being born into a temperature much lower than that maintained in the uterus, and that following removal from the water of the bath, are sufficient reasons for delaying the toilet of the child; and the fact that the mother needs rest after her trying ordeal, for postponing the first feeding.

It is now, during the first few days of life, that we must teach the child regularity of habits, and this can not be better begun than by adopting regular hours for nursing, namely, every two hours during the day, from 6 A. M. to 10 P. M., and every four hours during the night. By this means not only will the child be taught regularity, but the breasts will be more active at the regular nursing period. If there is a good flow of milk the contents of one breast will suffice for a feeding, otherwise both breasts must be nursed from at each time, allowing twenty minutes for a feeding. The practice of using the breast for quieting the child upon all occasions of fretfulness and restlessness can not be too severely condemned.

The child's temperature should be taken, for at least one week after birth, twice daily. Should the child be getting an insufficient quantity of milk, it will have an elevation of from one to four degrees of temperature above normal. My attention was first called to this phenomenon while an interne at the Sloane Maternity Hospital, New York City, by the resident physician, Dr. E. A. Tucker, who has aptly called it "starvation temperature." In the average case it occurs on the third or fourth day, the child is perhaps restless and fretful, its mouth is dry and red, and the temperature reaches 102° or 103°. If given an artificial feeding, or is nursed, the temperature will fall to normal almost immediately, as shown in the accompanying cut.

If the child is fretful it should not be given sage or saffron teas and other concoctions, but its temperature should be taken, and, if above normal, it should be fed artificially until the mother's breasts begin to secrete. The fact of the occurrence of the starvation temperature is very seldom recognized, but a test of it will show how true it is.

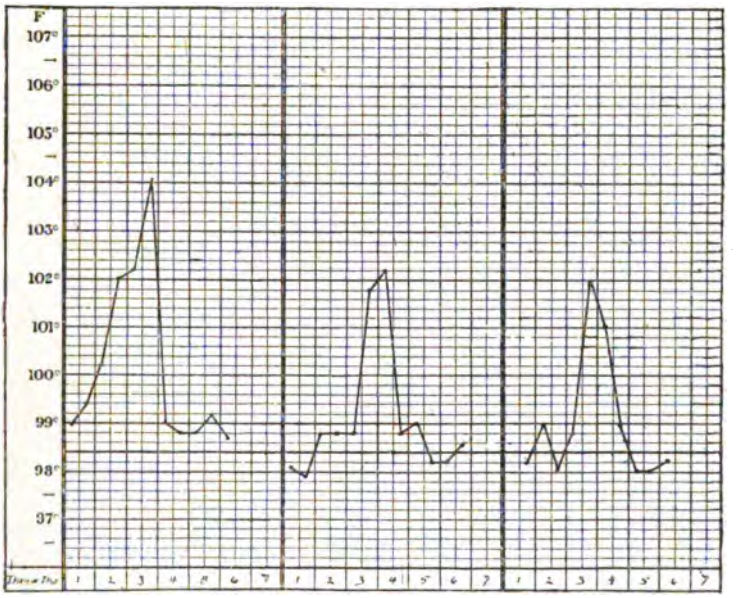

FIG. 2.

Weighing. A valuable means of ascertaining the progress of a child, which is too often neglected, is regular weighing. A child, from birth to six months of age, should be weighed weekly, as by this means, almost to the exclusion of all others, we can tell how the child is developing. During the first week there is generally loss in weight, but by the end of the second week the child should have regained its birth weight, and if there is a gain of less than four ounces weekly, or a stationary weight, we know there is some fault with its

nutrition, either in the quantity or quality of the milk which it receives, or its power of assimilation.

As a means of ascertaining the quality of mother's milk when it is suspected to be at fault, I wish to recommend and exhibit an apparatus devised by Dr. L. Emmett Holt, of New York. It was the writer's pleasure to make some two hundred and sixty examinations of breast-milk by this method, in which the progress of the child and the condition of the milk tallied in every instance.

As you see, the apparatus consists of a lactometer and of two graduated glass-stoppered tubes. A specimen of milk is obtained from the middle of a nursing, the specific gravity is found at a temperature of from 65° to 72° Fahrenheit, about an ounce being needed for the examination. For the cream test the tubes are filled to the top mark, and at the end of twenty-four hours the amount of cream is read off, each degree being one per cent. It has been found by repeated examinations that normal milk should have a specific gravity of from 1028 to 1031, with from seven to twelve per cent of cream.

A newborn infant's stomach has on the tenth day only a capacity of 2.5 ounces by weight, according to experiments made by the writer at Sloane Maternity Hospital (Archives of Pediatrics, May, 1893); and, if artificially fed, this amount should not be exceeded during the time when starvation temperature occurs and artificial feeding is required.

Mouth. An important precaution to prevent thrush or sprue is the regular cleansing of the child's mouth before and after each nursing. This is quickly and efficiently done by means of a cotton swab on the finger wet with a saturated solution of boracic acid, the natural enemy of the oidium albicans. The washing after nursing removes most of the milk left in the mouth, and the washing before nursing serves the double purpose of protecting the child's mouth and the mother's breasts from infection through a fissured nipple, should one exist.

Buttocks. Instructions should be given as to the proper care of the buttocks, for, should an erythema intertrigo develop, it is through the carelessness of the attendant that it occurs. The acid meconium, if allowed to stay for any length of time in contact with the delicate skin of the buttock, it soon macerates and an intertrigo develops. Regular washings of the buttocks and adjacent parts with clear water and a soft cloth, which should then be dried carefully and powdered with equal parts of boric acid and starch, or talcum powder, will suffice generally to keep the parts free from trouble. Many cases of intertrigo, when developed, are prolonged by the habit so prevalent of using napkins which have been dried before the fire instead of washed.

Circumcision. I wish to enter a protest against the custom of universal and indiscriminate circumcision of male infants. In the vast majority of instances, if the toilet of the penis be attended to by the physician, the necessity for circumcision after several months will be obviated. It should be the duty of the attending physician to reflect the prepuce of all male children when they are a month old, relieve the corona glandis of the smegma present, anoint it with olive oil or vaseline, and replace the foreskin. This should be repeated two or three times a month by the mother, and the parts cleansed. By this means there will be no pin-hole openings, and no reflex symptoms generally attributable to phimosis.

Breasts. Should milk accumulate in the breasts of infants, it as a rule needs no treatment, save perhaps the application of a plaster mull of zinc oxide or belladonna ointment.

DISCUSSION.

DR. CARL WEIDNER, Louisville: I would like to ask Dr. Tuley to give us an explanation of the starvation temperature of which he speaks.

DR. TULEY: I can give no satisfactory explanation of it. It has been noted in many cases, and the rise of temperature is not

caused by any thing else, because the temperature is observed to come down in a couple of hours after feeding.

DR. J. MORRISON RAY, Louisville: I desire to say, with reference to the care of the eyes of the newborn infant, that a year ago, at the meeting of the State Society, bearing upon this point, at my request a member introduced a resolution to memorialize the legislature to pass a law similar to that in force in New York and several other States with reference to the care of the eyes of the newborn infant.

MANIFESTATIONS OF THE RHEUMATIC STATE IN CHILDHOOD.

By Sam E. Woody, M. D.
Louisville, Ky.

The observant student of pediatrics, as his experience widens and his knowledge increases, finds every year more and more cases of true rheumatism in children. The doctor starts out into practice with a conception of the disease only as it appears in adults, the arthritis being the prominent and essential symptom. The other manifestations, being so much less frequent or marked in the adult, are considered in the nature of complications.

Observing the disease in children we get a broader conception. The extreme susceptibility of the child's organization and the increased vulnerability of its tissues give the disease wider opportunity for its protean manifestations than the more stable adult. Moreover, the arthritis so prominent in adults is generally slight in children, often so slight as to be overlooked or dismissed as growing pains, etc., or may be entirely absent.

The object of this paper is to emphasize the importance of other symptoms than arthritis as diagnostic of rheumatism in the child. None of them are to be regarded as complications or sequelæ. They are essential phenomena.

Tonsillitis is to be classed as one of these. It may occur at any stage of the disease, but generally ushers in the attack and almost always precedes the arthritis. However, when it occurs, as it sometimes does, without any other rheumatic symptom, rheumatism can not be diagnosticated. Out of sev-

enty-six cases reported by Haig-Brown in the British Medical Journal, September, 1889, only ten ever had rheumatism, though their parents had. The close relationship of the two diseases is further shown in the fact that salicylate of sodium is the most efficient treatment for both.

Chorea. That chorea is usually a manifestation of the rheumatic state is generally admitted. In the statistics of the Collective Investigating Committee, published several years ago, in over forty-two per cent of the cases of chorea arthritis was present. If to this forty-two per cent we add those in which the arthritis appeared later and those in which other rheumatic manifestations were present, the evidence is overwhelming. But why strive to prove what all clinicians admit?

Erythema Exudatum is more closely related to rheumatism in children than in adults; and purpuric erythema is still more closely related.

About a year ago I was called to see a two-year-old boy who had been ailing for a week or so. The father coming home in ill humor spanked the child severely for its indisposition to move around. I found the thighs and buttocks purple with extravasations. *There was tenderness of several joints and mitral murmur.* The child died next day from internal hemorrhage.

Pericarditis is as common in children as in adults, but on account of its insidious invasion is oftener overlooked. The classical signs are modified or even wanting. The exudate is mostly lymph instead of serum, and the pericardium becomes so thickened as to constrict the heart, restrain its movements, and retard its growth.

Endocarditis. This is the most dreaded of all the manifestations of rheumatism. It is twice as frequent in children as in adults, and as it often occurs without any joint affection, or, perhaps without any other manifestation at the time, it is frequently overlooked. The child is weak and feverish, but

there is nothing to call attention to the inflammation of the valves until, perhaps, long after, when a murmur with hypertrophy or dilatation reveals the trouble.

Fibrous Nodules in the subcutaneous connective tissue are a most frequent and important manifestation of rheumatism in children. They may be felt or seen in the connective tissue under the skin, especially over fasciæ and tendons, as small rounded bodies varying in size from a mustard seed to a pea. They occur mostly on the back and extensor surfaces of the body. Since my attention was first called to them, some years ago, I have found them the most valuable of all the signs of rheumatism in children. No longer than yesterday these nodules were the only visible indication of rheumatism in a six-year-old boy that presented himself in the outdoor department of the Hospital of the Kentucky School of Medicine, though a closer examination demonstrated the presence of endocarditis.

SOME REFLECTIONS ON THE CAUSATION AND THERAPEUTICS OF NERVOUS DISEASES.

By Curran Pope, M. D.
Louisville, Ky.

The last decade of that most modern branch, Neurological Science, has been marked by immense strides and much patient and painstaking work, experimental and clinical. There are few to-day who do not realize the many difficulties surrounding both the study and the practice of this branch. But the electric light of scientific investigation is shining with an effulgence that promises speedily to lay bare the hidden nooks and crannies of this most wonderful system and, perhaps, even permit us possibly to gaze upon the wonderful mechanism that governs the action of man's brain. To-day we recognize the neuron as the unit of the nervous system, and though its composition may be familiar to you all, a hasty and passing review will certainly make more intelligent that of which I am going to speak. A neuron consists of a nerve cell, its various branches, its axis cylinder, and arborescent termination. The cells are of various sizes and shapes; the protoplasmic processes of varying size and length, and the axis cylinders are either short or long, single, or breaking up into multiple branches and losing itself in the brain substance or entering long tracts of fibers. Some investigators believe the distinction is such that we can tell the difference between a sensory and a motor neuron.

The medical mind has been recently directed toward the presence and excess of uric acid in the excretions of persons suffering from various forms of nervous troubles, and some

French investigators go so far as to state that nervous disease and uric acid are one and the same thing. This is based largely upon the investigations and statements of Haig and Bouchard, whose experiments are marked by brilliancy unexcelled. I am constrained, however, to believe that the deductions therefrom are erroneous.

I believe that the positions assumed by Herter and Horbaczewski are correct, and that uric acid, largely derived from nuclein, is the detritus of tissue waste and a resultant of nerve functioning. In other words, the presence of uric acid is an indication and a manifestation of nutritive and digestive disturbance. It is the result of nutritive disturbances going on in the body where so many vito-chemical reactions take place.

Many waste products of an intricate nature are produced and thrown off into the circulating medium during the expenditure of force by the organism, and these must be carried through the channels of elimination to prevent auto-intoxication. We must get rid of the waste products of nutrition if we would utilize the beneficial and assimilative properties of the hemic pabulum.

It has always struck me that a person's system at this time resembled a city whose vast system of streets had remained uncleaned for some time, with ashes and garbage in the roadway and orange and banana peels on the sidewalks. The physician should be the street cleaning department, the board of health with its disinfectants, and the head of a police inspection system that will prevent its reaccumulation.

With this interesting condition presented for our consideration, what can be deduced from a therapeutic standpoint? Considerable experience in the treatment of all forms of nervous diseases has taught me, in many instances by the hardest of knocks, that elimination must precede nutritional treatment, and I have seen few cases that have not been benefited by this line of treatment, strictly individualized, in

its application to the case in hand. Space forbids my dealing specifically with the treatment in this direction, but in general it may be said that by dietary laws, the careful and proper ingestion of food, or for a while its restriction in very narrow limits, together with the ingestion of large quantities of water, hot, cold, plain, distilled, alkaline, or mildly laxative, as the case may require, will greatly assist your case toward recovery. These cases will require *all* your therapeutic knowledge, tact, and patience.

Neurasthenia. This brings me to a consideration of neurasthenia in a cursory manner, for the subject is too large to do more than touch it at a few points in its periphery. When Hodge first discovered the alteration and changes which a nerve cell undergoes after excessive functionation, he opened up a field that was pleasing to the neurologist seeking for a scientific foundation for functional diseases. The changes he found after excessive functionating were a diminution in the size of the cell, a lessened power to absorb staining reagents (showing imperfect assimilation and nutrition), and later vacuolation, as the substance of the cell is used. The nucleus then becomes jagged and irregular in outline. After a while it is impossible for the cell to send out impulses, and it requires a period of rest for recuperation and a storing of energy. Vas and Mann, quoted by Starr, also found that when activity reaches the point of fatigue a shriveling up occurs, changes go on in the chromatin, and it is used up so that the fatigued cell does not absorb staining reagents. When we glance at the causes of neurasthenia we are struck by the unanimity of authorities upon the fact that overwork is a very frequent cause of this malady. How readily it becomes apparent, since Hodge's discoveries, what changes take place in the nerve cells subjected to overstrain during health. We know that the neurasthenic is frequently handicapped by a poor foundation, that is to say, weakened by hereditary entailment. His nerve centers are poorly con-

structed or his vascular supply is just sufficient to maintain him during health at a moderate pressure while at work. When he begins to increase this pressure we find that the cell begins to suffer from imperfect nutrition, and it is within range to fairly assume that the changes before mentioned take place. This is not all, and it is to this next point that I particularly desire to call your attention.

With this defective nutrition of the cell comes defective elimination and irritation by metabolic changes which lie in and around the cell wholly or partially removed, and resulting in the production of various forms of headache, vertigo, inability to work and concentrate the mind, great irritability and general *malaise*. The recognition of the pernicious results of overbrain strain (and in some cases this strain is associated with underbrain power) enable us to intelligently appreciate and understand the underlying factors of the neurasthenic condition. There are few men in better position to study the peculiarities, the ambitions, the heart yearning and the struggle for existence than those whose daily practice is thrown with these cases. The active practitioner, upon whose skill, thought, and attention may depend the life of some human being suffering from an acute disease, can hardly be expected by his professional brethren, or the laity, to be *au fait* with this class of disease, and he certainly should be exempted from the reflections that these people are so apt to cast upon him. It would be far better for them to consider the ambition, the strain, and the greed that frequently forms the darker background upon which their troubles are painted. In this age every energy, night and day, is directed toward an increase of wealth, and with the night, instead of rest and recuperation, the struggle to obtain social position goes on apace. There are a large number of men and women who are living absolutely on the brink of nervous bankruptcy who have no reserve nerve force in case of some sudden and exhaustive demand upon the system. I think this is one of

the reasons why so many persons have succumbed to neurasthenia after acute infective processes, especially the grippe. He worries, he frets, and he can't help it; he tells you so; and what is the result? That most beautiful mechanism which in health regulates the caliber of his blood-vessels, the vaso-motor system, becomes unstable, and he is the victim of those manifestations which are in health the result of natural emotional causes. Pain (worry, anxiety, tribulation are simply modifications of pain) is always accompanied by vaso-motor change, and those of you who have had to do with the neurasthenic know that the hot flash, the sudden flush, the fullness of the head, excessive sweating and variations in the renal secretions are merely manifestations of this vaso-motor instability.

And, again, this is not a condition favorable to the elimination of those effete materials that are in themselves toxic and irritating to the nervous system. The therapeutic problem presented is one of vast interest, and to-day ranks, in my opinion, in interest, necessity, and importance with that terrible scourge tuberculosis, with which it has many points in common. How can a happy result be best brought about? We have to consider first, elimination; second, unstable and defective nerve force; third, nutritional disturbances; fourth, irregular or unstable vaso-motor supply. It requires a combination of methods that, alas! the pharmacopeia does not offer; and while medicinal agents are required, nay, of benefit, still I do not believe that they are capable alone of curing any case of this character.

Massage is of advantage in certain well-selected cases, but I believe its range is limited and its results to be obtained only by the most careful regulation of its force and duration. As a rule too much is given both in quantity and in force. Electro-therapeutics offer a better field, and in the galvanic, faradic, and static currents we find that by selecting cases excellent results may be obtained. In my opinion *hydro-*

therapy is by far the most satisfactory, pliable, and useful remedy that the medical profession possesses. After some years of experience with it I do not hesitate to say that I believe this agent, cautiously and carefully applied by a physician thoroughly trained in its application, to be the very best means for the correction of disordered nerve force, the elimination of waste products, and the toning of the vaso-motor system. *Rest* is frequently prescribed for these cases, and just as frequently as it is *it fails*. The reason for this is apparent. The exhausted nerve cells have not sufficient inherent recuperative power to utilize what pabulum is brought to them, and, while the rest may be of some slight advantage, in my opinion valuable time is wasted.

It is this non-attention to the eliminative process that robs rest of many of its advantages. I have found rest beneficial at the end of a course of a treatment when the vitiated nerve elements have been restored to their normal condition, and the patient is in a position, as it were, to clinch the advantages gained from treatment. In these cases sleep is of signal benefit, particularly that which is obtained through the hypnotic influence of hydrotherapy. Medicinally nervine and hematic tonics are indicated, and strychnia, quinia, iron, arsenic, and zinc head the list. If much digestive trouble exists, stomach washing, the mineral acids, and gentle laxatives are indicated.

Epilepsy. As time goes by the belief grows in force, and is strengthened by experimental and clinical knowledge, that underlying this condition is an auto-infection, arising from the stomach and intestinal tract, coupled with imperfect or defective elimination. Constantly growing experience shows that careful regulation of the diet and strengthening of the vaso-motor system is the one way by which at least one third of the cases of this terrible disease may be combated. What this toxin is we do not know, but that treatment based upon its elimination is efficacious clinical knowledge is con-

stantly demonstrating. These intricate changes in the chemistry of nutrition have defied the most expert investigators, and while the general facts remain, specific and minute data are not yet forthcoming.

I have a case just now in whom this treatment is beautifully exemplified. Formerly, under heavy doses of the bromide, the attacks were recurring and she was reaching a condition of utter despair. Under a carefully regulated diet and two weeks' careful observance of her case I was able to prevent the recurrence of the attacks, which were somewhat periodical, by keeping the intestinal tract well cleaned out and disinfected, and utilizing such hydrotherapeutic methods as insured active and well-distributed blood supply. It is interesting to note this relation between disturbances of nutrition, auto-infection, and epileptic attacks. I do not mean to be understood as saying that every case comes under this head, for they do not; but I do say that the condition is one that should be sought for. In regard to the Flechsig treatment of chronic, depraved, and trying cases of this kind, we have a system of treatment which I believe is the best that can be offered to these patients. I have found that during the primary stage, or the one during which opium is used, that much of its evil effects, soporific, depressing, and infective (from constipation), can be overcome by using eliminative measures, in the shape of large quantities of water internally and the douches, in their various modifications, externally. In the second stage, or that during which bromide is used, a cup of black coffee in the morning (only), the use of a hot-air bath for five minutes, followed by a rain bath and good rubbing, will entirely remove the languid and depressed feeling and prevent the acne from appearing. The Koran of the epileptic is water.

Headaches. This subject I have dealt with lately in a thorough manner, and I can only devote a few moments to its consideration. I will say in passing, that where a headache

has lasted for a long time we should certainly examine with great care the renal secretion, as in certain cases I have found unquestioned evidence of incipient or actual Bright's disease. Many of these headaches are lithemic in origin, and to this end the therapeutics must be directed. Diet and elimination is the keynote to the treatment. I have seen cases of headache lasting twenty to twenty-two years, and due unquestionably to meningeal thickening, relieved by the systematic application of static electricity and hydrotherapy. I have one case who eighteen years ago had an attack of meningitis of the convexity, and who has ever since suffered from most intense headaches which were especially aggravated by overwork and emotional strains. I have thought much over these cases, and the relief that has been given is only another proof of the efficacy of these treatments in relieving all conditions attended with vaso-motor disturbance. There is no question in my mind that this case, for instance, had in and around the meningeal thickening a condition, under overwork and emotional strain, of vaso-motor paresis, as evidenced by the increased throbbing, fullness in the head, feeling of tension, and increased pain. He began to improve from the first under hydrotherapy.

This brings me to the consideration of a condition that I have observed in the use of hydrotherapy in functional and in some organic diseases of the nervous system. It is what, for want of a better name, I term "cerebral and spinal toleration." There is no question in my mind that underlying this condition we have again the same factors I have mentioned before, viz., increased elimination and proper nutrition.

A tolerant nerve cell is a nerve cell that is well fed, just as a tolerant, amiable, happy-go-lucky sort of a fellow is one that is well fed and moderately obese. This is a very important factor in the prognosis of some cases that are usually pronounced incurable, from the simple fact that while the meningitis is not cured, taking my case as an example, still

we can frequently establish toleration and obtain what to the patient is a true cure and for which he longs. To us it may be symptomatic, but to him it is a verity.

Acute Infectious Diseases. Each and every one of you doubtless realize fully the importance of these diseases as the origin of many nervous troubles, functional and organic. For this reason they deserve careful consideration, especially diphtheria, scarlatina, grippe, and those diseases that are accompanied by the pyogenic micro-organisms, such as encephalitis and cerebral abscess. I have carefully gone over well-kept records of four hundred and fifty cases in private practice, and half to two thirds as many in dispensary practice, only to be surprised at the number that date the origin of their troubles to some acute infectious process. And the number grows when we include the chronic infection of lues. We find following the former, or acute disease, that functional troubles are very apt to result, and my records show large numbers who directly trace their neural breakdown to that scourge, the grippe, while the paretics and ataxics nearly always will be found to have some vascular derangement to which we can reasonably lay the cause of the disease. In this respect I wish to call your attention to a statement of Weigert's, that the process which we term sclerosis in the nervous system is merely a manufacture by nature of a supporting substance within the brain or cord to take the place of an atrophied nerve cell or fiber. We are able to explain rationally the existence of organic disease from exhaustive functional activity, and this latter may certainly be the starting point of organic disease. Many believe that the limitation of sclerotic tissue to definite regions is due to some selective poison acting upon and limited to definite parts of the nervous system. Weigert's statement, however, furnishes a most rational explanation of the peculiar distribution of sclerotic processes commonly known as system diseases.

His order of causal factors is, first, overwork; second,

exhaustion; third, atrophy of the neurons continued for a time and then followed by a growth of connective tissue, in the form of sclerosis, limited to a functional tract. It seems to be a conservative process on the part of nature to increase the supporting network as the cellular substance shrinks, and if this be true, and it is the most rational of all explanations of these scleroses, then the statement that these diseases in their primary stages are curable holds good. The writer made this statement in an article read before your honorable body two years ago, and, while that statement was based purely on clinical experience, he now has the statement of one of the greatest living pathologists to fortify him in the position he assumed. We may now begin to hope that by careful and painstaking study, early diagnosis, and rational therapy to be able to snatch our victim away from the all-embracing and enthralling tendencies of these diseases.

I have read lately an article, and I can not lay my hands upon the name of the authority, or I would quote his name, who makes the statement that general paresis is as curable during the first stage as is locomotor ataxia.

It is evident from the foregoing that the change that takes place, whether functional or organic, is located in the neurons and may be temporary or permanent, and is in its nature both chemical and physical. The change is the same, whether it be due to overwork, imperfect nutrition, acute or chronic poisoning.

STRICTURE OF THE ESOPHAGUS.

By M. F. Coomes, M. D.
Louisville, Ky.

One man's experience with this class of cases must of necessity be limited, so far as personal clinical experience is concerned, because of the comparative infrequency with which the disease is met.

Strictures of the gullet are divided into three classes, as follows:

1. Cicatricial, which are met with most frequently in children and young persons, particularly in children under five years of age. It is rather a curious fact at first to state that this form of esophageal stricture is more common in America than elsewhere; but when it is understood that the reason for this is that the American housewives and servants are economizers of muscular labor by using concentrated lye, and that this agent is often within the reach of the babe of the household, and with the ever-eager desire to investigate and imitate, which is inherent in the *genus homo*, it can be readily understood that children who have not arrived at the age of reason sufficient to protect themselves often get hold of the lye in solution and drink it, hence this form of stricture is more often met with in children, and more frequently in this country than others, because the agent is used more freely here than elsewhere. The location of this form of stricture is most frequently met with in the upper or lower part of the gullet, possibly for two reasons: If the solution is very strong only a small quantity is swallowed because of the pain, which causes the child to desist, and thereby causing the injury to

be confined to the mouth, pharynx, and upper part of the gullet. Where the solutions are weaker the fluid is passed rapidly through the mouth, and possibly by the time it has reached the lower portion of the tube its walls have become gradually thrown into a spasmodic condition by the irritation, and the fluid is retained at this point for quite a time before it is passed into the stomach, and the result of this detention is severe cauterization of the tube.

The question may be asked, why the stomach is not injured by the lye. In the first place the quantity taken by the child is usually small on account of the pain produced by it. In the second place the stomach usually contains more or less food, and that would prevent to a great extent injury that would occur if the organ were in an empty condition. Thirdly, the contents of the stomach are in an acid condition, which would counteract the action of the lye.

2. Cancerous stricture of the esophagus occurs most frequently in persons over forty years of age, and most frequently in men.

An analysis of one hundred and fifty-three cases of cancerous disease of the esophagus by McKenzie and Ziemssen shows that one hundred and fifteen of the cases occurred in men, and that one hundred and forty-eight of the patients were over forty years of age. Why this preponderance of the disease should be so great in the males is not clear. It could not be due to the quality or quantity of food strictly speaking. The use of alcoholic liquors and tobacco might in some way influence the economy so as to make the gullets of the consumers of these two articles more susceptible to the disease; and, as women are not so addicted to the excesses of these two toxines, if they do play any part in the production of the disease, it can be readily understood why the men are the more frequently attacked by it. It is claimed that cancer of the mouth occurs more frequently in smokers than in other persons. If this be a fact, then I can understand how the gullet

of the tobacco consumer would also be more liable to cancerous disease than those who abstain from its use. The saliva is saturated and much of it is swallowed, hence the influence of the poison is carried not only directly into the gullet, but is absorbed into the general circulation. The most common form of cancer met with in this locality is the *pavement-celled epithelioma.*

3. Esophagismus, or spasmodic stricture, is met with most frequently in hysterical women, and sometimes in men, but rarely so.

Prognosis. The prognosis of cicatricial stricture, or that which is produced by traumatic causes of any kind, will always depend on the extent and nature of the disease. Under ordinary circumstances it is favorable so far as life is concerned, most of the cases recovering in time. In this advanced era of surgical science death by starvation in any case of stricture of the esophagus is not to be thought of. Gastrostomy is almost without any danger so far as fatality is concerned, if properly done. The one great care necessary is to do a clean operation. It can be performed by any ordinary surgeon, a knife, forceps, needle-holder, and needles being the only instruments needed. It is needless to detail the many ways of doing this operation, but there is one cardinal point to be accomplished, and that is to establish an opening in the abdominal walls with the wall of the stomach so attached as to enable the patient to feed himself or to be fed without wearing a tube constantly.

There is one other question of importance in this connection, and that is the time of making the opening into the stomach. It may be made at any time if the case demands it, but it is best to stitch the stomach to the abdominal walls and mark the place by introducing two ligatures at suitable distances from each other, so that you can go into the stomach with assurance that you are right as to location.

The treatment of stricture of the esophagus is for the

most part mechanical or surgical, in fact entirely so save in the spasmodic form of the disease. In such cases the passage of a bougie to satisfy the patient that it is possible to swallow is often of great value, as it gives them confidence—at least in one case under my care such a procedure enabled the patient to swallow without further trouble. The treatment applicable to hysteria is the treatment in such cases.

Division of strictures of the esophagus by introducing the knife down the gullet through the mouth is impracticable and not without its dangers. Division of stricture from below has been accomplished, but it can only be done when the stricture is near the stomach. Gradual dilatation is the only practical method. No special rules can be laid down as to how often the instrument should be passed. Sometimes it will be necessary to dilate every day; again, every second or third day will suffice. Rapid or extreme dilatation is not to be thought of, as it is not only painful but dangerous. It should never be forgotten that the same nerves that supply the heart, lungs, and stomach, supply the esophagus. Force should not be used in the introduction of the bougie. Where the disease is the result of syphilis, the remedies that are used in the treatment of that disease should be used freely.

DISCUSSION.

DR. LOUIS FRANK, Louisville: The doctor seems to think that a bougie in the detection of obstruction in the esophagus is absolute. I have recently read the report of two cases of foreign bodies in the esophagus where, after repeated passages of bougies, they were found *post-mortem*. In one case reported the foreign body was found under a diverticulum; the other had perforated the esophagus. I mention these cases to show that we may be able to pass a bougie and still there may be constriction.

ADENOID GROWTHS OF THE NASO-PHARYNX.

By T. C. Evans, M. D.
Louisville, Ky.

In the animal economy we find a system or series of lymphoid or adenoid masses, situated in different locations along the alimentary canal and the respiratory tract, varying in number and location according to the habits and environments of the different species. These lymphoid masses appear to be modified or specialized lymphatic glands, or at least they are intimately connected with the lymphatic system. In man and other omnivorous mammals these masses of lymphoid tissue form a circle, or, more properly speaking, two more or less complete circles, one surrounding the naso-pharyngeal portion of the respiratory tract, the other the oro-pharyngeal portion of the alimentary canal. These circles are often described as the lymphoid ring, and embrace the faucial tonsils, the pharyngeal tonsil, the glandular bodies at the base of the tongue, as well as many smaller masses. Besides the lymphoid ring these masses are also found in the lower reaches of the alimentary canal, in the jejunum, and especially in the ileum; here they are known as agminated glands, or "Peyer's Patches." The exact function of these masses is still somewhat obscure, but it has been pretty clearly demonstrated that they possess a phagocytic action; the lymphocytes which make their way in and out these masses have the power of taking up the various forms of bacteria and destroying them.

The process appears to be similar, or rather supplemental to the general phagocytosis exhibited by the leucocytes of

the general circulation. This phagocytic power is evidently intended to protect the animal against infection by ingested or inhaled bacteria. But in diseased conditions of these masses, instead of protecting against the introduction of bacteria, they become channels of invasion. The lymphocytes, still possessing the power of migration and of enveloping bacteria and carrying them from the surface, appear to have lost their bactericidal power; instead of doomed prisoners the bacteria become mutinous parasites, feeding and multiplying on the protoplasm of the cells while they are being carried to a neighboring lymphatic gland.

In this paper I wish only to speak of the abnormal condition of those masses of lymphoid tissue situated in that part of the respiratory tract known and described as the naso-pharynx, the disease commonly known as adenoid growths of the naso-pharynx. Meyer, of Copenhagen, in 1868, was the first to fully describe this condition. Czermak, in 1860, Volintini and Lowenberg, in 1865, all seem to have observed the phenomenon, but for some reason failed to appreciate its importance. So Meyer is considered, and justly so, the discoverer of lymphoid hypertrophies in the naso-pharynx.

The disease consists of an hypertrophy of the lymphoid tissue that encircles the naso-pharyngeal portion of the respiratory tract, blocking up the space and mechanically interfering with or altogether preventing nasal respiration. This hypertrophy usually involves to a greater or less extent the faucial tonsils and other contiguous lymphoid masses. Except that it is essentially a disease of childhood, and that heredity seems to play some part in its production, otherwise little can be said as to its etiology.

The diagnosis is easily made from the characteristic symptoms which have been so fully and frequently described. The open mouth, the elongated face, the expressionless countenance, the dead or nasal voice, the inability to articulate certain consonants, the viscid mucus, the disturbed sleep, with

its sweats, snoring, and night-terrors, the chest deformity, deafness and mental hebetude, all make a picture that can hardly be mistaken. But if these are not sufficient, positive evidence can be had by passing the index finger into the naso-pharynx and making a thorough survey of its walls and contents. This procedure is easily accomplished; while causing considerable pain it can not possibly do any harm. In older children some information can be obtained by the use of the rhinoscope. In addition to the impaired hearing, the deformities of nasal, buccal, and thoracic cavities, which are among the most distressing and persistent of the sequelæ, and have been recognized since the days of Meyer, I wish also to call your attention to another danger from diseased lymphoid tissue that has until quite recently been overlooked—that of a channel for tubercular infection. Though diseased lymphoid masses have long been recognized as fruitful sources of infection in diphtheria and the exanthemata, special attention was not called to the fact that they played an important rôle in tubercular infection until 1894, when Dr. Sims Woodhead delivered an address before the North London Medico-Chirurgical Society on "The Channels of Infection in Tuberculosis" (Lancet, October 27, 1894), in which he forcibly demonstrated the dangers from diseased lymphoid masses, especially the pharyngeal tonsils. In speaking of the part played by the "lymphoid ring" he said: "It is found when pigs are fed on tuberculous material held in solution, especially if the solution contains fatty or viscid material, that in a very large proportion of cases these animals become affected with tuberculosis of the gland associated with the tonsils." Further on he says: "So far as can be made out from a careful consideration of the results reported by observers who have collected statistics, and have performed feeding experiments, and from my own observation of a number of similar experiments, I am driven to the conclusion that this method of infection of the glands of the neck through the tonsils must be of

comparatively frequent occurrence, especially in children living under insanitary conditions and subjected to various devitalizing influences." After describing the process of invasion in the pig from the tonsil to the glands in the neck, and to the thorax by the mediastinal and poststernal lymphatics, and by the intercostal lymphatics, until the glands at the root of the lungs become infected, he says: "Of course in children it is not possible to demonstrate this line of invasion in the same way that one can in experimental animals, from the simple reason that in experimental animals the disease can be traced from the very earliest stages to the time at which marked external signs of tuberculous glands make their appearance, but sufficient can be made out by any one who will classify the results of a large number of *post-mortem* examinations of children, when the conditions of the glands of the various parts of the body have been noted, to convince him that the process of invasion of the tonsil, or at any rate of the lymphoid tissue in this region, is of a comparatively frequent occurrence; much more frequent than even those who have examined a large number of cases of tubercle in children are at first inclined to suppose. The very cells, then, which in health have to do with the destruction of bacilli, and with protecting the organism against their invasion, are those which appear to be responsible for the conveyance of tubercle bacilli from the outer surface to the tissues beneath."

From the researches and experiments of Dr. Woodhead it is evident that a considerable number of the cases of pulmonary tuberculosis, especially in early life, are secondary to tuberculosis of the bronchial glands at the root of the lungs, and that in many cases the channel of infection is through the pharyngeal or faucial tonsils. Besides the abnormal condition of the tissues themselves in hypertrophy of the pharyngeal tonsils, we have constantly present a surface of greater or less extent denuded of its epithelium, as is shown by the

small quantities of blood which so often streaks the viscid secretion from the naso-pharynx.

I think it reasonable to conclude that the enlarged cervical and bronchial glands, which so constantly accompany lymphoid hypertrophies, are due to tubercular infection through this channel; that instead of being a part, a diathesis, or dyscrasia, which has generally been described as lymphatism or scrofula, they are most likely the result of tubercular infection through the diseased lymphoid masses, either of the pharyngeal ring or of the Peyer's patches.

To again quote from the article of Dr. Woodhead, he says: "I am sure that those of you who have made any considerable number of *post-mortem* examinations of the bodies of tuberculous patients, who have succumbed at various periods of life, will agree with me in this, that the affection of the lung often appears to (although the ultimate cause of death) be merely a secondary affection. I have seen case after case in children, and in animals fed on tuberculous material, the lung markedly affected; but in a large proportion of these cases it has been possible to trace the course of invasion back from a caseous or old calcareous mesenteric gland through the chain of retro-peritoneal glands up through the diaphragm to the posterior mediastinal and bronchial glands and so on to the lungs. I have not seen this in a few cases only, but in dozens of children, in a few adults, and in many animals. We also have an example of a secondary affection of the lungs following tubercle of the pharyngeal tonsillar structure, through the glands of the neck, then those in the thorax, and finally to the lung itself, in the examples that have already been given of infection of the pig by tuberculous milk."

In going into detail of dangers from tubercular infection, somewhat to the exclusion of other symptoms and sequelæ of adenoid growths, I do not wish to be understood as underestimating their importance, but they have been so often given that a repetition is here unnecessary.

The treatment of *adenoids of the naso-pharynx* is either expectant or surgical. The probability of favorably affecting lymphoid hypertrophies by the use of drugs, either topically or constitutionally, is so remote as to scarcely entitle it to consideration. The expectant plan, the "outgrowing" process which the parents so confidently count on, has at least this advantage, that the hypertrophy usually diminishes with age and sometimes entirely disappears with adolescence. The cavity of the naso-pharynx is proportionately larger, so that the respiratory obstruction, so far as the naso-pharynx is concerned, is diminished or altogether disappears. On the other hand, the deformities due to years of mouth-breathing do not disappear with the "outgrowing" of the obstruction. The high-arched palate, the contracted nasal chambers, the deformed alæ, with their small round nostrils, the listless facial expression, due in part to the deformity, and in part to the impaired hearing, have by this time become so much a part of the physical makeup that neither time nor treatment can effectually efface them. The expectant plan is at best long, tedious, and uncertain, entailing years of suspense on the physician and parent, and subjecting the patient to dangers which when once encountered can not be corrected.

In speaking of the removal or destruction of pharyngeal hypertrophies by surgical means it will not be necessary to review the many operations that have been devised, and the almost endless list of instruments and appliances that have been invented for this purpose, most of which have for various reasons been abandoned. Most operators now confine themselves to one of three methods, viz: First, removal by the post-nasal curette; the most efficient instrument is what is known as the improved Gottstein curette; with this it is possible to completely remove the hypertrophies from the dome and posterior wall of the pharynx without danger to the eustachian tube or the soft palate. It is the only instrument necessary for the operation, except occasionally in intract-

able children a mouth-gag will be of service. Second, removal by post-nasal cutting forceps; all the post-nasal are in fact modeled after the old post-nasal forceps of Lowenberg. I think the one in most common use at this time is what is known as Gradle's forceps, which consist of triangular fenestrated blades, the fenestræ being guarded by a shield to prevent the excised tissue from falling into the larynx. The only danger in the cutting forceps is to the soft palate, which can be held forward with the finger or tied out of the way.

In this connection I wish to state that where for any reason it is necessary to hold the palate forward, it is best to at once pass a tape or soft catheter through the nose and tie the palate out of the way. None of the many palate retractors have in my hands been satisfactory. Instead of getting a view of the post-nasal space, I have usually gotten the contents of the stomach. Probably the chief question is whether or not general anesthesia is required. The hemorrhage after the operation is quite profuse for a few minutes, making an annoying and troublesome complication in the use of anesthetics. This danger can be lessened but not entirely obviated by the position of the patient during the operation, placing the head lower than the body, so that the blood will gravitate away from the larynx. As a rule I operate without an anesthetic. Patients who were old enough to talk intelligently have often told me that the curetting produces no more pain than the preliminary exploration with the index finger. Cocaine seems to do little good in these cases, and is not well borne by children.

The dangers of the operation, other than those due to the administration of anesthetics, under adverse conditions, are almost nil. There is no shock, and the subsequent discomforts are rarely sufficient to confine the patient to bed. The galvano-cautery is only applicable in a small per cent of the cases. It is indicated in the sessile or cushion-shaped growths. Such conditions are usually found during youth. In these sessile tumors the hypertrophy is of the connective

tissue, rather than the stroma of the pharyngeal tonsil. Destruction by the cautery is generally regarded as the most conservative operation, but it is also the most difficult. The use of the galvano-cautery presupposes a tractable patient with a tolerant pharynx, an operator sufficiently skilled in the use of instruments to manipulate the rhinoscopic mirror with one hand, the electrode with the other to locate and limit the point of cauterization by the image in the mirror. No one should be reckless enough to introduce a cautery electrode into the naso-pharynx without being able to watch and guard the process from start to finish. Electrodes are used both through the nose and behind the palate. The destruction of any considerable amount of tissue by the galvano-cautery is tedious and will require many sittings.

DISCUSSION.

DR. J. G. CARPENTER, Stanford: I indorse the paper *in toto*. My experience has been that of Dr. Evans. It is a good plan when we examine the vault of the pharynx to enucleate or crush the growth with the index finger. In children I have succeeded admirably in doing a radical operation at the first examination. In others I have had to use an anesthetic and have succeeded surprisingly with the forceps. Now, when we have an enlarged tonsil we have stenosis, impaired hearing, symptoms of catarrhal inflammation, and the removal of the growth cures the other troubles as a rule. We may have other complications, as that of hypertrophy of the faucial tonsil, and it is remarkable sometimes how soon the hypertrophy subsides when you make a free breathing place through the pharynx. I do not know a more frequent predisposing cause to phthisis pulmonalis than that of diseases of the throat; at least that has been my observation; and nowhere else do the tubercle bacilli grow so freely as in the lymphatics of the nose and throat and travel rapidly to the lungs and bronchi. I have contended for this point several years, and spoke of it first at a meeting of the State Society held at Richmond. I regret that other rhinologists have not taken up the point more fully than they have.

PHLYCTENULAR OPHTHALMIA.

By S. G. Dabney, M. D.
Louisville, Ky.

Though all the text-books present an excellent description of phlyctenular ophthalmia, yet there are certain points in regard to it which most of them fail to mention and about which there seems to be some diversity of experience. Hence I have thought it worth while to present to this Society a brief paper on the subject.

The importance of an examination of the throat and naso-pharynx, the value of eserine in the local treatment, the relative importance of constitutional and topical medication, and the indications and contra-indications to the use of cocaine, are matters not entirely agreed upon.

According to Hirchfeld, six per cent of the blind in the asylums of Saxony have lost their sight from phlyctenular ophthalmia. In this country, and especially in the South, we may expect the proportion to be decidedly larger, because it is a common observation that the disease is more frequent and far more serious in the negro than in the white. In this respect it is the opposite of trachoma, which is very rare in the negro.

It constitutes about one fourth of all the diseases of the eyes in children. It is often considered as two separate affections according as the conjunctiva or cornea is involved, but as the epithelium of the conjunctiva is continued over and forms the anterior coat of the cornea, and as the etiology, and with certain important modifications the treatment, is the same, it seems wiser to look upon the disease as a single

one, sometimes implicating one of those structures and sometimes both.

It is often known as scrofulous or strumous ophthalmia. These terms, in a measure at least, indicate its causation. It is most common in delicate children with enlarged lymphatic glands, adenoid growths, and hypertrophied tonsils. A French writer (Pierre) has recently gone so far as to state that the micro-organisms which produce the disease have their origin in these enlarged pharyngeal and faucial tonsils. This statement, clinically, seems a little far-fetched. More likely these affections of the throat and that of the eyes are both results of the depraved general nutrition. It is by improving this that operations for adenoid and hypertrophied tonsils are often of great benefit. The authors of our standard text-books do not sufficiently emphasize the importance of such procedures. Neither Noyes, Roosa, Berry, nor Fuchs allude to the subject. Deschweinitz says merely that phlyctenular keratitis is in close connection with obstructive and inflammatory diseases of the nasal passages. Of course the nasal discharge and the eczema at the margin of the nostril are described by all writers.

That an outbreak of phlyctenular ophthalmia should frequently follow measles and scarlet fever is as natural as that these diseases should frequently be followed by adenoid growths in the naso-pharynx, and is due to the same cause: impoverished general health and irritation of the ocular and naso-pharyngeal mucous membranes. Errors in diet are of all causes the most prolific in producing this form of inflammation in the eyes. Candy, cake, tea, and coffee, pastries, and overindulgence in sugars are all injurious. Bad air and dirty surroundings play a large part. Heredity, to the extent at least of a feeble constitution, is often a predisposing factor. These reasons explain why it is so common to see a number of children in the same family affected.

The characteristic symptom is the phlyctenule. The der-

ivation of this word is from the Greek, signifying a blister, and is somewhat misleading, as is pointed out by Fuchs, "since the efflorescence is never really a vesicle, but a solid though soft projection, formed chiefly by an accumulation of lymphoid cells." The number and size of the phlyctenules, and what is of most importance, their location, vary greatly. The large conjunctival efflorescence is known also as pustular conjunctivitis. The minute miliary phlyctenule at the corneal margin is the variety most likely to be overlooked, erroneously diagnosed, and often maltreated. The most unfortunate situation is in the center of the cornea, just over the pupil. A delicate opacity remaining permanently here is one of the most frequent causes of impaired vision. Lachrymation, with conjunctival or circumcorneal injection, is usually, and pain sometimes, present. But the most characteristic symptom of phlyctenular inflammation of the cornea is the intense photophobia. Indeed a diagnosis may be made with very little chance of error when we see a delicate, pale, strumous child with eczema about the lids and nostrils, a running from the nose, and its face buried in the pillow, or the eyes tight shut and the hands pressed over them. Forcible opening of the eye is followed by a gush of tears and sneezing. The consequences of this corneal invasion may be recovery with no remaining opacity, when only the epithelial layer has been involved, or an opacity of greater or less degree, or a perforating ulcer. To discuss the results of the latter would carry us beyond the limits of this brief paper.

According to Deschweinitz the most dangerous form of the disease is the single pustule at the corneal margin, with yellow infiltrated edge and tendency to perforation. But the most frequent way in which I have seen great loss of sight produced has been by repeated attacks, each leaving a more or less dense corneal opacity. This tendency to recurrence is well known, and must be combated chiefly by proper diet

and mode of living. Iwanoff has found the efflorescence to occur along the course of the corneal nerves, and thus is explained the intense sensitiveness to light and consequent blepharospasm.

Treatment must be constitutional and local. Neither can be disregarded with justice to the patient. The diet should be simple, nutritious, and given at regular times. Candy, cake, pastry, and so on, should be carefully avoided. Milk, of course, should be given in place of tea or coffee. A daily sponge bath in salt water is often valuable. Plenty of out-door exercise should be insisted on, the eyes being protected from light by a shade or smoked glasses, or both, but never bandaged.

Among medicines, syrup of the iodide of iron and cod-liver oil hold the first place; quinine is often indicated. The local medication must be determined by the situation and acuteness of the disease. Where the sensitiveness to light is intense, with pain and great injection, atropia should be used. In two forms of the corneal involvement atropia is often decidedly injurious, and eserine should be used in its stead, namely, in the minute miliary phlyctenules at the corneal margin and where there is an ulcer which threatens to perforate in this situation. It seems that the value of eserine in the miliary form is often overlooked. Neither Berry nor Fuchs nor Swanzy refer to it in this connection; yet I have seen many cases in which the disease persisted and grew worse under the use of atropia (or without it) rapidly improve when eserine was substitued in its place. The form and strength in which I prefer the drug is a solution of a half grain of the sulphate to the ounce of distilled water. Stronger solutions are apt to cause headache.

The eserine should be dropped into the eye every three or four hours. The two remedies of most general application are calomel and the yellow oxide of mercury salve.

The calomel is especially valuable in the conjunctival pustules. A little should be dusted on with a camel's-hair

brush or some absorbent cotton. Its action often seems almost like a specific in such cases. According to Fuchs, recent investigations have proven that the action of calomel is a chemical one, and that minute quantities of it are generally transformed by the sodium chloride in the tears into corrosive sublimate. Whatever the explanation of its action, there can be no question of its value in many cases. The yellow oxide of mercury should be used in a salve of a strength generally of about one grain to the drachm. It should be rubbed into the conjunctival sac once or twice daily. It is often of value in corneal ulcers and in the opacity which remains after their healing. As to the use of cocaine in corneal ulcers there is some diversity of opinion. Thus Koller, to whom we are indebted for our knowledge of this wonderful anesthetic, strongly disapproves of its use in corneal disease. After alluding to its brief effects he says: "It can be shown that the use of cocaine in corneal affections is positively harmful. Cocaine is a general protoplasmic poison, as more recent biological researches have proved; it first stimulates the protoplasma and afterward paralyzes it, prolonged and repeated action finally causing mortification. It is very easy to demonstrate that repeated instillation of cocaine into an eye causes a general slight haziness and dotted erosions of the epithelium. I noticed these phenomena in my first experiments with cocaine, and was at first inclined to ascribe them to dryness and evaporation due to arrested secretion of tears and diminished winking of the lids brought on by the local anesthesia. But a series of experiments undertaken on rabbits established beyond doubt that although dryness plays some part in the haziness and exfoliation of the epithelium, it is chiefly due to necrosis of the epithelium brought on by the direct action of cocaine."

Such words from such an authority deserve great consideration. Deschweinitz also cautions against the prolonged

use of cocaine in corneal ulcers. Yet I must say that my own experience with its use has been favorable. I often combine it with eserine, and use it in conjunction with atropia also. The same principles of cleanliness and antisepsis hold true in phlyctenular as in other forms of corneal ulceration. To discuss this phase of the subject fully would exceed the limit of my paper. I have above alluded to the importance of an examination of the upper air-passages. Very great benefit is to be obtained from removing adenoid growths and enlarged tonsils when they exist, and from attention to the nasal mucous membrane.

DISCUSSION.

DR. J. G. CARPENTER, Stanford: In persons with feeble constitutions, in the young or in old people, we must be exceedingly careful how we use cocaine in their eyes. I have seen local necrosis occur twice, once in a feeble child, and the other in an aged man. I find that there is no treatment more salutary than direct treatment to the nasal passages, and in phlyctenular ophthalmia, aside from feeble constitution and dyscrasias, I believe the most powerful local cause is disease of the naso-pharynx. Treat that properly and the eye trouble subsides.

DR. J. MORRISON RAY, Louisville: The subject of phlyctenular ophthalmia is an exceedingly interesting one, for the reason that a very large percentage of the eye diseases we encounter, especially in children, are the result of so-called phlyctenular or strumous ophthalmia. In the examinations I have made of the inmates of the Institution for the Blind, among white children 15 per cent had relapsing attacks of phlyctenular ophthalmia, while in the colored inmates there was 32 per cent.

We all recognize the importance of constitutional treatment; the internal administration of syrup of iodide of iron, cod-liver oil, and other tonics. We also recognize the importance of this trouble with the nose, and there are a great many of these cases that are associated also with extensive eczematous inflammation about the nose, about the angles of the mouth, ears, and about the head. In fact, nearly all cases of persistent relapsing

attacks of phlyctenular keratitis have associated with them eczematous conditions about the head; therefore, at the same time, we should use local medication in connection with constitutional treatment. We must use something to correct the eczematous condition.

I have never made a routine practice of the use of cocaine in the eye as a therapeutic agent. I do not think cocaine is indicated in any ulcerations about the corneæ. I sometimes use it to allay pain in superficial inflammation about the eye. As a therapeutic agent it is absolutely of no importance whatever.

DR. P. R. TAYLOR, Louisville: As regards the cause of phlyctenular ophthalmia, as a rule we have constitutional trouble with local manifestation in the eye, and at the same time more or less irritation in the nose, from the fact that the nerve supply to the conjunctiva and floor of the nose is about the same. We find that authorities describe two characters of this trouble. One will tell you that it extends from the face to the cornea; another, that it is limited exclusively to the cornea, and we do not have an eruption on the head or even on the face. It is well to use local treatment to the nose in connection with the constitutional treatment. Were it possible to keep a patient relieved of photophobia, excessive lachrymation, and pain, we would get rid of the trouble strictly by constitutional means.

As to the use of cocaine, I have been using it extensively in the last three or four years. I read an article before the Society at Frankfort, in which I advocated its use in twenty-per-cent solution. I have had very beneficial results from it. I use it, in combination of course, with the yellow oxide of mercury, or mercury in some form.

DR. GEORGE W. BEELER, Clinton: It occurs to me that the eye specialists of the present day want to monoplize the subject of the treatment of the eyes, and I think they ought to in view of the fact that they give their whole attention to it. When we have these meetings, and when they talk upon the subject of the eye, we, as general practitioners, say very little about these subjects. We listen to them and we are benefited by their advice. When I commenced the practice of medicine we did not have a respectable oculist in the State of Kentucky. We did not recognize eye specialists in those days, as some of the old physicians here will remember very well. In speaking of phlyctenular oph-

thalmia, years ago we used to treat diseases of the eye as well as other parts of the body. I have noticed that children with a strumous diathesis are more liable to this trouble, and, as some of the gentlemen have remarked, we find also some affection of the nasal passages in the great majority of cases, and one of the speakers has suggested that in order to be successful in the treatment of phlyctenular ophthalmia we must treat also the nasal mucous membrane. In the treatment of this trouble I have used nitrate of silver with a compressed bandage about the eye, and, while I do not recall the number of cases I have treated, I do know that a good many of them do better than when we use the yellow oxide of mercury and calomel in the eye.

With regard to the use of cocaine, I do not like it; neither do I like atropia, because it dilates the pupil of the eye, and as soon as the eye is exposed to light the patient suffers more pain. As constitutional treatment I would use the syrup of iodide of iron and cod-liver oil.

DR. F. J. YAGER, Campbellsburg: This is a subject upon which I desire to say a few words. I am glad Dr. Beeler has agitated the subject. His remarks are good and pointed. I have gone over the ground of which he speaks myself. He has told you that with our old-time treatment we were generally tolerably successful. But while I would make these statements with a great deal of confidence and assurance, still I have cases in which it is difficult to effect a cure, and I am glad we have specialists to send them to and let them shoulder the responsibility. In my early practice I have applied salt water to scrofulous eyes, and various other little common things, which, along with the *vis medicatrix naturæ*, have helped to effect favorable results. These specialists are capable of throwing new light upon these subjects. If they do not take these cases in hand and assume the responsibility they would be in a worse condition than they are to-day. If they do not cure every case, I am satisfied they benefit a great many, and the country at large is far better off now that we have specialists.

DR. DABNEY (closing the discussion): I desire to express my appreciation of the remarks of Drs. Beeler and Yager. I value their opinion most highly as general practitioners, especially with such long experience as these gentlemen have had. We appreciate very intimately the relationship between diseases

of the eye and those affecting the general health, and on that special relationship they have given us most valuable instruction.

In regard to the word catarrh, the cases called catarrh in our text-books on diseases of the eye will be found to have their origin in those soft growths that exist between the nose and throat—the naso-pharynx. You put your forefinger up there and you feel them like a bunch of worms; that is the source from which the discharge comes, runs from the nose, and irritates the nostrils. When these growths are present, unless we resort to curetting or remove them with the forceps, we must expect considerable irritation or trouble from them.

In regard to atropia, I would take issue a little with Dr. Beeler on that point. I think most of you have seen cases of little children or grown people who have an intense sensitiveness to light, accompanied with pain, who would lie awake and rub their eyes and experience a great deal of trouble. In such cases atropia helps to allay those symptoms. In addition to that there is a tendency to involvement of the iris, and atropia removes the danger from that source.

As regards sensitiveness of the eye to light, by dilating the pupil of the eye it allows more light to enter, but we must counteract this effect by smoked glasses. Twenty-per-cent cocaine, as mentioned by Dr. Taylor, would be likely to do harm. The ordinary solution which I use is a four-per-cent one, and although at rare intervals a twenty-per-cent solution might be useful, I should hardly think of using it habitually. Dr. Ray spoke, and I believe Dr. Beeler agreed with him, in regard to the routine use of cocaine. I do not approve of using it in a routine way. It is a valuable agent for examination as well as for treatment. Little patients, as we know, have an intense blepharospasm. The old practice was to dip the head in cold water until they gasp for breath. This allays the spasm of the lid. Cocaine may be used for the same purpose effectually.

I was interested in the point Dr. Ray made in regard to the relationship of this disease to eczema. Prof. Horner, in Zurich, had an enormous experience with this form of strumous ophthalmia, considering it a form of eczema. The race proclivities are interesting. It is a well-known fact that the negro race are much more prone to the disease, and when it occurs it does so in a much more violent form than in whites.

THE BLIND OF KENTUCKY: BASED ON A STUDY OF ONE HUNDRED AND SEVENTY-FIVE PUPILS OF THE KENTUCKY INSTITUTION FOR THE EDUCATION OF THE BLIND.

By J. Morrison Ray, M. D.
Louisville, Ky.

On previous occasions I have presented two papers to this Society, one on Hereditary and Congenital Eye Diseases and one on Contagious Eye Diseases and Preventable Blindness. Much of the material upon which these papers were based was obtained from an examination of the inmates of the Kentucky Institution for the Education of the Blind, which I had the opportunity of doing through the courtesy of the learned principal, Prof. B. B. Huntoon, and with the kind assistance of Dr. W. O. Bailey.

It appeared to us, that since no accurate scientific examination by some one competent to differentiate between the various kinds of eye diseases could be made for the entire blind of the State, a fairly good idea of the principal causes leading to the loss of eyesight might be obtained from a study of the pupils in this institution. In it are collected children from all parts of the State and from all walks of life who have lost their eyesight from disease and injuries. In some useful sight is still maintained, yet not sufficient to allow of their obtaining an education in the public schools.

The census returns for 1890 give Kentucky a population of 1,858,635, with 1,976 blind, or one blind person to every 940 of inhabitants. According to the same census the pro-

portion of blind in the entire United States is 1 to 1,218. In England the proportion is 1 to 1,235, and on the Continent of Europe, notwithstanding the density of the population and the hard conditions of the poorer classes, the proportion is only 1 to 1,000.

The location of this State, its climate, the absence of any great crowding of population, and the general health, prosperity, and vigor of its people should militate against the spread of contagious diseases or the development of such conditions as determine the transmission of contamination.

The number of children examined was one hundred and seventy-five; of these one hundred and thirty-nine were white and thirty-six were colored. The following is a synopsis of the diseases encountered:

Purulent ophthalmia is responsible for a larger number of these cases than any other one disease. It was plainly the cause of the blindness in forty-six cases, thirty-nine whites and seven colored, or 26.2 per cent. The local conditions present in these cases were complete atrophy of the ball or large corneal opacities with synechia or staphyloma. The majority of these were caused by eye involvement shortly after birth, constituting the cases of ophthalmia neonatorum; a few, however, while showing evidently the ravages of a purulent conjunctival inflammation, appear to have developed at some period remote from parturition.

Phlyctenular keratitis, or so-called scrofulous ophthalmia, was found in twenty-five cases, thirteen whites and twelve colored, or 14.2 per cent. The most notable point in these cases was the much larger percentage of this disease in the negroes, thirty-three per cent being blind from this cause. The history furnished was that of recurring eye inflammation that eventually led to perforating corneal ulcers involving collapse and shrinkage of the eyeball, or large opacities with incarceration of the iris. These cases presented in nearly every instance evidences of eczema about the eyelid, nose, or

mouth, associated with enlarged glands in the neck or cicatrices showing the ravages of former glandular suppuration.

Congenital cataract was found in twenty-three cases, nineteen whites, four colored, or 13.1 per cent. The most interesting facts in connection with these cases were found in a study of the family history. Seven of the twenty-two cases occurred in two families, five in one, two in another; two other cases gave a history of other members of the family being similarly affected. A number of these cases had submitted to operation by absorption with benefit.

Trachoma (or so-called granular lids) and its sequelæ were found to be the cause of defective sight in twenty-one, or 12 per cent, all whites. These cases presented extensive corneal opacities, with pannus or atrophy of the eyeball as the result of perforation from trachomatous corneal ulceration. A few showed changes, the result of shrinkage of the conjunctiva, leading to inturning of the lids and trichiasis. One case of interest presented the condition of xerosis, the entire conjunctival and corneal epithelium having undergone the peculiar fatty degeneration that sometimes follows long-standing conjunctival inflammation. This was the youngest subject in which I have encountered this complication.

From the southern and eastern parts of this State numbers of cases of trachoma come to us, which a well-known ophthalmologist in a neighboring city has designated "Kentucky trachoma." The lids are densely hardened and pannus is abundant. Many of the cases in this list I am reporting are of this character.

The absence of any cases of trachoma among the colored children bears out the observation made by Burnett that it rarely or never occurs in this race.

From a clinical observation extending over several years and including several thousand cases of eye disease in the negro I have found but two cases of granulated lids among them, and the subjects were bright mulattoes.

Atrophy of the optic nerve was found in sixteen cases, or 9.1 per cent; twelve whites, four colored. The exact nature of the atrophy was difficult to decide, many of the cases presenting the oscillations of the eyeball known as nystagmus to such an extent as to prevent careful study of the changes in the nerve. Seven of these cases, all whites, showed nystagmus and history of blindness since birth. In two of these there was in addition to the white optic nerve a congenital smallness of the eyeball (microphthalmos). Five cases, three white, two colored, gave a history of blindness from meningitis; two of these cases followed measles; two, both colored, presented the condition of hydrocephalus with optic atrophy. In the two remaining cases the blindness came on at or about the sixth year without any exciting cause, and they gave a history of blindness in other members of the family.

Iridocyclitis was found in ten cases, seven white, three colored, or 5.7 per cent. These cases presented evidences of extensive inflammation involving the iris and ciliary body. The pupil is occluded by inflammatory lymph, and the eyeball shrunken or very much diminished in tension, and in two of them the anterior chamber is completely obliterated. One case gives history of three other members of the family being blind. In another case the mother is blind also. One case is the result of cerebro-spinal meningitis, and the other of meningitis following some unknown fever in infancy. Another case, in addition to the obliteration of anterior chamber and blocking of pupil by lymph, shows in the facial aspect and notched teeth the evidences of congenital syphilis. There are nine cases blind as the result of traumatism in both eyes or traumatism followed by sympathetic inflammation in the fellow eye. In six of these the patients are white, three colored; four of these have lost both eyes from injury, one from powder explosion, one from dynamite; one case shows that a gunshot wound destroyed both eyes, the missile passing into the left temple and coming out through

the right orbit; in its course the bullet traversed the left orbit, destroying the optic nerve and lacerating the choroid. In its exit it completely disorganized the right eye. In the other case one eye was lost by a kick from a horse, the fellow eye being destroyed later by a knife wound.

The five sympathetic cases showed complete posterior synechia, inflammatory cataract, minus tension, following complete destruction of the fellow eye by penetrating wounds through the sclero-corneal margin.

A point of very great importance in the treatment of penetrating wounds of the eye is to remember that in children sympathetic inflammation is more prone to ensue than in adults, therefore such cases should always be very carefully watched.

Retinitis pigmentosa was found in four cases, three white, one colored. This is a disease about which a great deal has been written in proof of the statement that it is prone to follow consanguineous marriages. While this may be true to some extent, I believe that it is also often the result of inherited syphilis. Incomplete family histories were obtained of the three white cases examined; two of them are brothers. The third is a female, who has a brother in the same school that presents congenital hydrophthalmos, and these two are members of a family of seven children, three of whom are blind. In neither of these families was there a history of the parents being related, but the hydrophthalmos case has notched teeth and the physiognomy of congenital syphilis. By some it has been maintained that retinitis pigmentosa does not occur in the negro. This examination showed one well-marked case.

Very closely allied to retinitis pigmentosa were four cases of central congenital choroiditis; these were all white. The ophthalmoscope disclosed large patches of choroidal atrophy involving the macular region. These spots were abundantly pigmented around an irregular margin, and a few pigment

spots were scattered throughout the fundus. One of these cases also presented posterior polar cataract, and another the characteristic Hutchinson teeth. Six cases presented the form of corneal inflammation and its complications in the shape of iritic adhesions and cyclitic degeneration that are usually attributed to congenital syphilis. These cases all presented notched teeth. Four cases presented the condition of albinismus, all whites; two of these were sisters; two were found with distension of the anterior chamber producing the condition called hydrophthalmos; they were also evidently cases of inherited syphilis.

The peculiar oscillation of the eye called nystagmus was found in one white and one colored; combined with the nystagmus in these cases were congenital amblyopia and a high degree of hypermetropia, probably the result of arrested development in the eye. One case, a boy, sixteen years old, was found to be blind from simple non-inflammatory glaucoma with glaucomatous cupping and atrophy of optic nerve. This boy is one of a family that shows a remarkable tendency to eye disease; two brothers and one sister are said to be blind from the same disease, coming on in each instance about the age of puberty. An uncle is blind, and the father partially blind from the same disease. One case, colored, was blind from destruction of both corneæ, the result of smallpox. The face offered other evidences of the ravages of the disease.

The rarest case in the institution was presented in the person of a female with congenital absence of both eyes, so-called anophthalmos. A careful examination of this case showed all the ocular appendages well developed. By pressure and close inspection no rudimentary eye could be found; the orbits appeared somewhat shallower than normal. The child otherwise was was well developed and mentally was quick and bright. The family history in this case so far as obtainable was that the mother and father were healthy, but that

another member of the family, a sister, was blind. It would be interesting to ascertain the cause of the sister's blindness. An inquiry was not rewarded.

Collins, in 1888, was able to find only thirty cases of congenital anophthalmos recorded in medical literature. In nine cases *post-mortem* examination failed to find any trace of an eyeball in the orbit. This condition must be due to interference with the formation of the primary optic vesicle, and therefore occurs very early in the course of pregnancy. In six of the cases collected by Collins maternal impressions were given as the cause.

A condensed table shows the following results:

Contagious diseases produced	67 cases,	or 38.3 per cent.
Hereditary and congenital diseases produced	57 cases,	or 32.6 per cent.
General diseases produced	42 cases,	or 24 per cent.
Injuries produced	9 cases,	or 5.1 per cent.

While this is a detailed report of only one hundred and seventy-five cases out of 1,976, it appears sufficient to give us some idea of the prevalent causes of blindness in the State.

While the examinations were all made upon children, I find by comparison with similar examinations made upon adults that the proportion differs but little; especially is this true of the report by Oppenheimer of 572 adult blind in New York City.

The fact that there is one blind person to every 940 of population in this State reflects not only upon the culture and education of the people, but on the intelligence and skill of the physicians of the State.

Fuchs has shown that under identical conditions the poorer and more ignorant a population is the more blind persons are found. While the increase of general knowledge subjects the eye to do more work, thus necessarily increasing the number of eye diseases, it is true the more refined the people become the more prone are they to attend to trivial

eye diseases, which, if neglected, may lead to serious consequences.

TABULATED REPORT OF CASES.

	White.	Colored.	Total.	Per Cent.
Purulent ophthalmia,	39	7	46	26.3
Congenital and lamillar cataracts,	19	4	23	13.1
Trachoma,	21	. .	21	12.0
Phlyctenular keratitis,	13	12	25	14.3
Atrophy optic nerve,	12	4	16	9.1
Traumatism and sympathetic ophthalmia,	6	3	9	5.1
Retinitis pigmentosa,	3	1	4	
Iridocyclitis,	7	3	10	5.7
Albinismus,	4	. .	4	. .
Congenital central choroiditis,	4	. .	4	. .
Anophthalmos,	1	. .	1	. .
Congenital syphilis,	6	. .	6	. .
Hydrophthalmos,	2	. .	2	. .
Congenital glaucoma with atrophy,	1	. .	1	. .
Nystagmus,	1	1	2	. .
Smallpox,	. .	1	1	. .
	139	36	175	

OBSERVATIONS IN OPHTHALMIC PRACTICE.

By William B. Meany, M. D.
Louisville, Ky.

Without illuminating we will proceed in a general way with some observations from a clinical aspect in the citation of two cases of so-called tobacco amblyopia (symmetrical and unsymmetrical).

Case 1. Charles A., aged fifty years, presented himself in February, 1892, for treatment; vision with each eye $\frac{1}{200}$; can not read near type; color blindness for red, with encroaching scotoma for green. Says he "could see perfectly about Christmas time;" appearance of the fundi normal in both eyes, with the exception of some minute specks near macula in the right eye. Ordered ferri et potassæ tart. in conjunction with the tincture of nux vomica, to be taken three times daily. The patient admits being a "smoker and drinker."

Rather more than a year after the onset of the amblyopia, he again called in the "faint hope" that something might be done to mitigate his condition. The ophthalmoscopic examinations were in accordance with those first observed. There was a notable marked diminution of the retinal arteries and a distension of the veins; the tension of the globes, normal; the vision, however, had now declined to scarcely more than mere perception of light.

By retinoscopy a small amount of hypermetropia was detected; nor did the closest questioning elicit any fact on which a specific trouble could be playing a part. There was no albumin in the urine, the specific gravity of which was 1022. Stimulants had been proscribed for a year, but smok-

ing, however, on the admission of the patient, "was moderately indulged in."

Here we have a case of central visual defect, color blindness for red, and encroaching blindness for green; a central amblyopia or a true retro-bulbar neuritis.

With the internal medication of hydrarg. bichlor., potassium iodide, ferric perchloride in energetic doses administered three times daily, followed by a pill of extract of nux vomica and extract of hyoscyamus for some four weeks or more, exercise by walking, with strict observance to personal cleanliness, and the moderate use of tobacco, his vision registered, that is with 1 D. to correct the hyperopia he reads $\frac{6}{12}$; + 4 D. for presbyopia and hyperopia combined, reads No. 10 Jaeger 16″. The retinal vessels have resumed their natural proportions, and the color blindness is no longer marked.

CASE 2. William T., aged forty-eight years, came first for treatment about April, 1892, for defective vision in right eye:

R. E. V. = $\frac{2}{20}$ and 10 Jaeger″. L. E. V.= $\frac{2}{20}$ and 1 Jaeger″.

Retinitis was suspected, and he was ordered five grains of the iodide of potassium thrice daily; a two-grain solution of atropine was instilled into the right eye.

He returned January 15, 1893, having neglected coming for treatment until his vision in the left eye had also failed. He stated that he was a "regular drinker and smoker," and consumed about one ounce of very dark and strong tobacco daily.

V. = R. $\frac{20}{100}$ 19 Jaeger at 7″. V. = L. $\frac{20}{200}$ 16 Jaeger at 7″.

The fundi were normal; the fields for white good, but there was a scotoma for red and green extending from the fixation point to beyond the blind spot, and about 15° upward and downward; inside this area he called red yellow, and green white; outside of it he recognized well. There was no scotoma for blue; knee reflexes normal; pulse 80, compressible but not intermittent. He complained of having lately been subject to palpitation of the heart if he exerted himself;

has frequent attacks of nervousness; has neither albumin nor sugar in the urine; no specific history. Hydrarg. bichlor. with ferric chloride and tinct. of nux vomica were prescribed and pushed energetically; the medicine to be taken three times daily, followed occasionally with saline aperient draughts. The using of a milder tobacco, to displace the stronger sort, permitted.

January 26th. V. R. $= \frac{20}{60}$. V. = L. $\frac{20}{100}$.

The constant current was applied to the left eye, but produced no improvement.

February 19th. V. = R. 1 Jaeger badly. V. = L. 10 Jaeger badly.

By the first of April, 1893, V. $= \frac{20}{20}$ and 1 Jaeger with each eye.

Here is a case of unsymmetrical "tobacco" amblyopia notwithstanding the teachings of the numerous writers on this affection who do not hesitate to state positively that "scotoma of tobacco amblyopia is invariably symmetrical."

Is there a physician who at some time in his medical career has not been taught that the exact symmetry of this affection is one of its marked features; and do not their patients state that the "sight failed in both eyes at the same time; and on testing their near and distant vision does one "always find the same amount of defect in each eye"? We are aware, however, that occasionally a slight deviation between the two eyes coexists, which is accounted for by an original difference in visual acuteness. Is the lowering of color perception due to the lowering of visual acuteness, or is it due alone to the use of tobacco?

A brief inquiry into the anatomical conditions in the disease described affecting the fundi, optic discs, and their contiguous intracranial connections appears to be rather more pertinent than apologetical. The optic nerves have their origin in the thalami optici and the corporæ quadrigemini, receiving filaments from the corporæ geniculata, with fila-

ments from the corporæ geniculata, tuber cinereum, lamina cinera, the anterior perforated space, the gray substance of the brain, and the posterior columns of the spinal cord, the optic apparatus being a series of projections: the first the retinæ, a secondary projection in the cortex of the occipital lobe, or, as some will have it, in the angular gyrus.

That excisions of the cortical area produce hemianopsia on the opposite side is very generally agreed upon; and, if it were possible to remove each layer of nerve cell in this region, we might find one in which the visual projections from one eye are recorded. Assuming this to be true, is it unreasonable to believe that there is a higher center in which both halves of the eye are represented on one side of the brain? It is hard to say just why tobacco has been selected as a leading factor for producing what is called toxic amblyopia by a large number of writers; while their apparent enthusiastic eagerness to ignore alcohol, shutting out almost entirely any intercepting lesion, whether central or peripheral, appears to mystify the doctrine and make it difficult to advocate.

Is it unreasonable for one to be more inclined, taking into consideration the "eccentric" character of patients who are said to especially suffer from this form of amblyopia, to favor some mechanical obstruction to nutrition, inflammation excited by tuberculosis, or even circulatory or vasomotor disturbances, keeping in the front the neurological elements, as some of these factors appear to be in a degree present in most all the forms of amblyopia, and not make tobacco alone chargeable for certain undeveloped or overexaggerated types of amaurosis?

A shock to the nervous system from a railroad accident has been said to be followed by the so-called tobacco amblyopic indications. That a "peculiar" form of white atrophy of the optic nerve, distinguished by some ophthalmologists as having a "peculiar haziness" surrounding the edges of the discs, and by others without this "peculiar" effusion or

blurring of the outlines of the discs, is attributed to the use of tobacco, should from this variance call for explicit explanation.

Take a case of megrim, and we find the patient unable to see with one eye, said to be due to sensory inhibition due to sensory discharge; except in the case of visual discharge, though commencing on one side will spread to both.

Does not the present limited knowledge of the relations of those aspects of the fundus of the eyes to what is concurrently going on in the optic avenues, and their several contiguous portions of the complex double brain and spinal cord, prove to us how rudimentary is our insight into this important field of inquiry? When we take into consideration the study of the brain functions (employing that term in the widest sense), and of the aberrations occurring in it that we call disease, we see that the subject is still in its very infancy. Can we so readily differentiate the various forms of amblyopia and not be "startled" when we hear it stated or see it set forth in writings describing a form of amblyopia produced from tobacco alone?

What physician in the school of ophthalmology, no matter how enlarged his experience and favorable his surroundings to the proper study of the aberrations found in eye troubles, can discern so readily the localization of the early stages of locomotor ataxia, anesthesia retinitis, uremic and anemic conditions, and many other disturbances, from the symptoms of "tobacco" amblyopia; for is it not a fact that in the majority of instances we are unable with assurance to assign a cause?

Among the toxic agents, exclusive of tobacco, that are said to cause axial neuritis may be mentioned lead, sulphur, bisulphide of carbon, the smoking of stramonium leaves for the relief of asthma, and quinine. The symptoms indicative of "tobacco" amblyopia are in a degree more or less present in the early lesions of the spinal cord, the brain embolism of the arteries, dementia-paralytica, loss of blood, alcoholism, trau-

matism, syphilis, tuberculosis, epilepsy, menstrual disturbances, nephritic conditions, fevers, anemia, rheumatism and podagric disturbances, and *la grippe*.

That a number of cases of the so-called tobacco amblyopia get well, even though the smoking was kept up, will not be denied; that a resolvent and antiphlogistic treatment and measures adopted for the improvement of the general condition and health of the patient are very much in evidence as the means of mitigating the disease and bringing about a cure in even old-standing chronic cases is to this day unquestioned.

The habit of smoking is now probably at its apogee, certainly it would be difficult to give it a wider scope of action. It may be taken as a rule that every man smokes who by idiosyncrasy is not disabled from indulgence. They who scorn the "filthy habit" and are disposed to attribute "ever so many ills" to its use belong to two or possibly three categories, whose classification need not be detailed here.

It may be prudential to mildly infer that possibly some of our friends, reasoning from their anti-tobacco standpoint, assuming that the "weed" is responsible for a certain form of amblyopia, endeavoring to satisfy themselves with a cursory examination, even to the ignoring of the physiological aspect, and to further their reasoning in contradistinction to anatomical facts, are sacrificing themselves on the "altar of duty" rather than promulgating their purposes.

A CASE OF MONOCULAR RETINITIS ALBUMINURICA.

By Harry J. Cowan M. D.
Danville, Ky.

The subject of this sketch, a student eighteen years of age, was referred to me by Dr. W. R. Evans, April 29, 1892, on account of diminished acuity of the right eye. At that time O. D. V. = 3 O. S. V. = 1. There was a neuro-retinitis of the right eye, with a punctate white exudate around the macular. The left eye was normal. The patient looked and felt entirely well; urine contained a small quantity of albumin; history of an illness six weeks before, lasting about one week, characterized by loss of appetite, languor, backache, and headache; had discovered the loss of vision four days before his visit to me.

Frequent urinary examinations showed the quantity and specific gravity always within normal limits, a small quantity of albumin, and occasionally a hyaline cast.

June 8th. The condition was unchanged.

September 11th. O. D. V. = 7 O. S. V. = 1. In the right eye the papillitis had disappeared; white spots are to be seen around the macular; the urine contains albumin.

Febuary 8, 1893. O. D. V. = 9 O. S. V. = 1. Both eyes appear normal; the urine contains no albumin. His urine has been examined many times since and under various conditions, no albumin has been found, and the quanity and specific gravity are always within normal limits. The boy is entirely well.

*Bull reports a case of monocular retinitis in a patient with chronic Bright's disease.

†Yveck reports a case of monocular retinitis albuminurica involving the left eye only, the right remaining normal. At the autopsy it was found that the patient had but one kidney, the left, which "presented the characteristics of the large, white, parenchymatous nephritis." These cases are, however, so rare as to be clinical curiosities.

The ophthalmological picture of retinitis albuminurica is also sometimes seen in cases in which there is no kidney disorder.

‡Schmidt-Rempler refers to two cases presenting the typical picture of retinitis albuminurica occurring in patients with intracranial tumors who had no albuminuria.

Finally, cases have been reported in which this lesion was observed in connection with albuminuria without organic kidney disease.

‖Gowers refers to a case of Eale's, the sight of whose left eye failed the day after an injury to the left lumbar region. Three weeks later there were white spots near the macular along with yellowish exudation around the disk, and a slight papillitis. The albumin gradually disappeared and the eye became perfectly normal. Gowers also refers to fourteen cases of functional albuminuria reported by the same author. In five of these "retinal changes were observed, white specks in four, white patches in one."

Marple has seen an apparently typical case of albuminuric retinitis of one eye, in a woman twenty-one years of age, where repeated examinations of the urine failed to find albumin or casts. He concludes: "According to the testimony of the best observers unilateral neuro-retinitis of Bright's disease, even where it remains unilateral for only a short time, is of rare occurrence; cases which remain for months or years with only one eye involved are exceedingly rare."

*American Journal Medical Science. †N. Y. Medical Journal. ‡Ophthalmology. ‖Ophthalmoscopy.

In regard to the case reported in this paper, two theories are to be considered; either the ocular trouble was the sequel of an acute Bright's, or it occurred in conjunction with a simple persistent albuminuria. In favor of the former is the history of an acute illness six weeks before the loss of vision; of the latter, (1) that while he was under observation he presented no other symptoms of organic kidney disease save the changes in the urine and the ocular trouble, and (2) the quantity and specific gravity of the urine was entirely normal and only hyaline casts were found. These retinal changes are observed so infrequently, except as one of the lesions of chronic Bright's or of the nephritis of pregnancy or scarlet fever, that the case was thought worthy of a short report.

ACNE ROSACEA INDURATA PUSTULOSA: A CASE.

By J. W. O'Connor, M. D.
Elizabethtown, Ky.

Realizing the difficulty the average general practitioner has in recognizing many forms of skin disease, and believing that this form of skin disease is rather rare in this country, and with the hope that it may be of interest to this Society, I report this case.

On November 28, 1894, Mrs. I. W., a widow, aged thirty-two years, white, a native of Kentucky, the mother of two children, called at my office to consult me in regard to a skin disease of the face. She said she had consulted and had been treated by several physicians, but the disease was gradually growing worse.

She gave a history of dyspepsia and constipation. The skin disease commenced about two years ago, soon after the death of her husband. She first noticed a few pimples on the nose, which gradually spread over the nose and both cheeks, with a few on the forehead. Previous to this she would often have a flushing of the face, or hot flashes, as she called them, and the skin of the face was always greasy.

At this time she was very much below par and quite nervous. Her face was covered with bright red indurated pustules, varying in size from that of a pin-head to that of a small bean, many resembling a bean in shape, nearly all containing some pus. The integument generally was very much thickened, and pressure upon it would move the entire cheek. The capillaries were enlarged, congested, and tortuous.

I commenced treatment by opening the pustules with a sharp-pointed bistoury and squeezing out the contents, then inserting a pointed stick dipped in Monsel's solution as a cautery and germicide. After opening all the pustules, I would sponge the face with five-per-cent carbolized water. I interdicted the use of all soap and recommended bathing the face in hot water night and morning, after which rub in with a piece of flannel a three-per-cent alcohol solution of salycylic acid. At first this is to be mixed with three parts water and made stronger and stronger until it was used pure. I gave internally 1-10 grain doses of calomel every hour for a few days, with a pill of aloin, strychnia, and belladonna at bedtime. I would alternate this every few days with sulphur tablets, one grain every two hours, and tablets of iron, one grain, arsenic 1-20 grain, and strychnia 1-30 grain, every four hours. My patient gained rapidly in flesh, the dyspepsia and constipation was relieved, but the eruption yielded very slowly. There was a pretty good crop of pustules to open two or three times a week for about eight weeks, when they gradually began to disappear, and after about six weeks longer they were all gone.

The thickened integument and new growth of connective tissue also disappeared with the indurated pustules. The redness of the skin was slow to yield on account of the varicosed condition of the capillaries, but finally left under the continued treatment of hot water and massage.

There are many other remedies recommended, and many others I have tried for the treatment of this disease, but none so efficacious as those given above.

According to Fox, Heitzman, and others, different terms are used to designate the different forms of this disease, but I think there are no hard and fast lines that can be drawn, except perhaps between the simple acne of youth and the chronic form of middle life, as described in this case. I think a term should be used to describe as accurately as possible a

certain disease, hence I use the term "Acne Rosacea Indurata Pustulosa."

It is a chronic inflammation of the face, made up of acne spots, periglandular inflammation, erythema, and new growth of connective tissue growing independently of the glands. An excessive amount of sebum is secreted, and the skin feels greasy (Seborrhea). The connective tissue round and about the glands hypertrophies. The acne spots become indurated and hard. The color of the redness is bright red; the vessels become varicosed and ramble freely over the surface of the diseased parts, suppuration is quite marked, and the integument is generally thickened.

According to Fox, this disease occurs in women of middle age who suffer from dyspepsia or uterine disease, and is aggravated by trouble, stimulating food, and by alcoholic drinks.

It must be remembered that the circulation of the face is sensitive to irritants; it is liable to great fluctuations; it is very active when the glands are particularly well developed in the face; they are therefore likely to become permanently deranged. All debilitating causes, all local causes of irritation and disorder of those organs which have a reflex relation with the face, for example, the stomach and uterus, as well as want of cleanliness, cold winds, the use of cosmetics, etc., may induce glandular congestion and also acne. The treatment must consist in removing the cause of reflex irritation of the stomach or uterus, personal hygiene, tonic and local treatment, as given in the above case. The after treatment consists in the exhibition of a general course of tonics, the mineral acids, or arsenic, or iron, or cod-liver oil, as seems best suited to the individual case in hand.

NON-OPERATIVE TREATMENT OF INTERNAL HEMORRHOIDS.

By W. O. Green, M. D.
Louisville, Ky.

Can internal piles be cured without an operation? This question more frequently than any other must be answered by the surgeon who is often consulted for rectal disorders. It may be confidently asserted that in carefully selected cases appropriate treatment employed in a scientific manner will relieve a large proportion, probably a majority, of patients without recourse to operative interference.

There is a deeply rooted idea, unfortunately too often entertained by the legitimate practitioner, that few cases of this disease can be relieved by non-operative measures. Such beliefs, in the present advanced state of our knowledge, must appear prejudicial and unprogressive and are often harmful not only to the physician but to the patient.

The reaction that has appeared from the many distressing accidents of the quacks, together with a prevalent desire for brilliant and more remunerative surgery, seem to have caused the pendulum of scientific modes to pass the point of conservatism and swing to the extreme limit of radical measures. It is true that when judiciously operated upon few cases fail to reach permanent recovery, but it does not follow that such satisfactory results should justify this method of treatment alone. Many cases of piles reach an equally satisfactory end by much simpler means, and it would be not only undesirable but unjustifiable for the surgeon to attempt to relieve them

by operation. The following case may serve to illustrate the point:

Mr. X, a lawyer, came to my office in September, 1892, for consultation. He stated that for five or six years past irregular hours and sedentary habits, incidental to his professional duties, had occasioned periodical attacks of constipation. About eight months before, during one of these attacks, he took a strong purge and noticed that following the action of the bowel there was slight pain in the anal region and a few drops of blood were passed. In the course of a day or two these symptoms disappeared and he felt no more discomfort until the onset of the present attack. About two weeks before consultation another attack of constipation came on, as a result of excessive smoking and late hours, which required the free use of purges, and when the bowels began to act there was considerable irritation about the rectum. After each action there was a sensation as if the bowel had not been relieved, which brought about violent and prolonged straining.

In the course of a day or two a protrusion appeared at the anal orifice, which at first returned spontaneously, but later remained outside, became swollen and tender, and bled freely when the bowels moved. The bleeding and pain annoyed him so much that he consulted a physician, who diagnosed his trouble piles, and advised an immediate operation. The patient had a very great dread of any surgical procedures, and, being compelled to keep at his work, declined operation at once.

He came to me for consultation the next day. I examined him and found a mass of six edematous piles that had come outside the anus on the previous day. The sphincter muscles had become very irritable, and constricted the protruding mass to such a degree that he was unable to return it. The parts were exceedingly sensitive, and walking or sitting or any manipulation gave him considerable pain.

A diagnosis of internal hemorrhoids was made, and it appeared that he might be relieved by judicious treatment

without the intervention of operative interference. Accordingly the piles were painted with a local anesthetic, anointed, and reduced. This gave him almost instantaneous relief from the pain. He was then directed to go home and lie down for the rest of the day, avoiding as far as possible any mental or physical exertion. When the bowels acted and the piles protruded, he was to bathe the parts, anoint the mass freely, reduce it, and lie down for a short time afterward. He was then instructed about his habits, bathing, diet, and exercise, and given a laxative to secure a comfortable daily action of the bowel.

Ten days later all symptoms had disappeared, and after the third day he felt no more inconvenience. Examination showed a disappearance of the piles, and the parts seemed quite normal. He was seen a little more than two years later, and he stated that he had neither seen nor felt any return of the trouble. An examination at this time revealed the fact that the parts were in a perfectly healthy condition.

In some instances the case will appear on the borderland, so to speak, and unless the surgeon makes a very thorough investigation he will not be quite certain that the patient can be relieved without an operation. He should spare no effort in gaining all available information, and, if needs be, see the patient several times in order to satisfy himself as to the exact condition of the parts. Should such an investigation still leave him in doubt as to the plan he should follow, in view of the fact that such a large proportion of the cases can be successfully treated by the non-operative method, he should first give this plan a fair trial.

When I first began to feel convinced of the value of the non-operative treatment in these cases, I followed the course of giving the patient the right to choose a course for himself without attempting to influence him in either direction. It is almost needless to say that in the majority of instances preference was given the simpler method, and I am pleased

to say time has since demonstrated that they seldom made a mistake in their choice. Here is a case in which the patient requested the simple measures to her advantage:

In March, 1891, Mrs. Y, aged fifty, applied for treatment of her rectal trouble. In consequence of a good physique and an active life she had always enjoyed good health. From her earliest recollections she had always been the subject of constipation. Six months previous, while straining at stool, a protrusion no larger than a hazel nut was forced down, and remained outside the bowel for several days. This became tender and began to bleed freely, after which she was able to "put it back." It has come out several times since, but there has been no bleeding for a month or more. The constipation has likewise persistently remained. Two days before the consultation she took a powerful cathartic and a painful diarrhea was brought on. At the time she was seen there was very violent straining at stool, with the loss of a large quantity of blood and mucus, and the prolapse had again forced itself outside and was very painful.

Examination showed a tender edematous pile protruding from the posterior portion of the anal orifice. The sphincter muscle was irritable, but not hypertrophied. A small purplish pile appeared anteriorly also when she strained. This was quite tender, and, after remaining outside a few minutes, began to bleed slightly. There were one or two very sensitive points just inside the bowel that could be detected with the finger.

She was given opium and bismuth, together with local sedative applications, and instructions for the regulation of her diet. This was continued for three days, when the diarrhea was checked and the pain subsided, though she was quite anemic. An iron tonic was ordered to be taken three times a day. Four days later it was decided to institute simple measures for the relief of her piles.

Accordingly I began the hypodermic injections of a ten-

per-cent solution of liquid phenol. She received nine such treatments during a period of forty-nine days, and beyond a slight stinging sensation during the time of the injections no pain was felt at any time. The protrusion disappeared, all bleeding ceased, and there was no further annoyance from constipation when she was discharged.

She was seen again in December, 1894, nearly four years later, and there had been no return of her piles or any unpleasant symptoms referable to the part. Examination showed the parts to be entirely healthy and quite free from piles.

Some cases from the first seem to be curable only by operation, but if the surgeon perseveres, and the patient is persistent and judicious in following directions, the disease will yield and the treatment often brings forth most gratifying results. Mr. Allingham recognizes these cases, and while at St. Mark's Hospital, London, I had the pleasure of conversation with him on the subject. He believes that they are rarely observed in hospital practice, and are generally due to some derangement of the liver. In consequence, he thinks highly of the employment of the muriate of ammonia and iron in their treatment. He reports a case of this kind in the 1888 edition of his work on Diseases of the Rectum, which was permanently cured in four years by the use of laxatives, a small bougie, proper diet, local applications of astringents, and the remedies mentioned above.

These cases are no doubt seldom seen, and will generally be found among the better class. Those who have the time and means to undergo the necessary treatment may often be rewarded with a cure in much shorter period than Mr. Allingham found requisite in the case cited.

It will appear oftentimes that the most scientific forms of simple treatment will give the patient relief only for three or four years. This point is often put forward as a strong argument in favor of the operative procedures. Because the ben-

efit lasts only a limited time, it does not preclude the possibility of the patient obtaining relief a second or even a third time, when the effect of the former treatment has expended itself. Besides, should it be deemed advisable, an operation may be instituted after the disease has returned the second or third time.

On the other hand, it may be stated with equal confidence that in a number of apparently promising cases the most approved forms of operation will yield no better results than those obtained by simple treatment, *i. e.*, the disease will return in three or four years. I have a case of this kind at present under my care—quite typical of the class—that came to me through the courtesy of my friend, Dr. Blue.

There are many cases which can not be relieved by operation, or where the benefits that may be obtained are so slight that this form of treatment is undesirable and not worth the risk incurred. In fact, an operation upon many of these would be not only unjustifiable, but productive of serious error.

The form of piles that may be included in this category are those which complicate other more serious diseases of the rectum, or where the pile is a mere symptom of some other trouble of a neighboring or remote organ. It may be that some grave constitutional disease is present that would render such a form of treatment dangerous to life.

Thus it would be doing a patient who suffers from a cancer or stricture of the rectum a great wrong to lull him into a sense of security by removing some complicating pile and leaving the real cause of his suffering without adequate attention. Should the disease be dependent upon an enlarged prostate, a diseased bladder, or misplaced uterus, any attempt to cure by operation will almost certainly prove of no avail. Pregnancy, except in extreme cases, where life may be endangered from the loss of blood, or the symptoms become unendurable, should contra-indicate surgical measures. And

lastly, no surgeon would expect to accomplish a satisfactory result by attempting such radical procedures in cases where the disease is a complication of Bright's disease, diabetes, certain forms of organic heart trouble, atheroma, or cirrhosis of the liver.

In many of these conditions, however, the disease may be greatly modified and the most distressing symptoms will often disappear under very simple forms of treatment. In fact greater relief is frequently procured in this way than by operation.

The following appears in my case book at the Kentucky School of Medicine:

A carpenter, aged fifty-eight, applied at the clinic for treatment of his piles. Three years ago a protrusion about the size of an acorn began to appear when he went to the closet. When forced violently out, it would occasionally get pinched by the irritable sphincter muscles and become very painful to him. It was usually returned inside the bowel with a little manipulation, but would seldom bleed. Two months previous, during an attack of diarrhea, it became strangulated, and remained outside several days, causing him a great deal of pain.

At the time he presented himself for treatment, there was pain at the anal orifice that came on immediately after each action. This pain was of an aching nature and lasted usually the remainder of the day. Sometimes after a large supper, or when he ate an indigestible substance, the suffering would again appear and keep him awake for several hours.

There were two protrusions that occasionally came down when the bowel moved. The presence of these outside always aggravated the pain, and frequently created the desire to strain violently, but when reduced these symptoms in a great measure disappeared. The reduction was generally accomplished with little difficulty, but it would often come out a second and a third time before the desired relief could be obtained.

The bowels acted only twice a week, and he was compelled to employ cathartics to procure a daily evacuation. The actions were well formed, of a light yellow color, and passed without straining, except when the prolapse came out.

Examination of the abdomen disclosed an abnormally large liver, which careful investigation proved to be hypertrophic cirrhosis. On this account operative treatment was not considered to be indicated or justifiable.

He was placed on the protoiodide of mercury, given a tonic, a sedative application, and directed to attend to local cleanliness, and keep the piles inside the bowel. In six weeks he became quite free from annoyance, except for the pain that would come on occasionally at night, and this could almost always be traced to some imprudence in eating.

While much can be said against the custom of universally employing surgical operation for the disease in question, it would be equally unwise to maintain that all cases can be cured without operative interference. In reality there are many sad mishaps which almost daily come under observation and abundantly prove that some of the non-operative means, when injudiciously followed, not only fail to relieve the disease, but leave the sufferer in greater distress than before. The following may serve to emphasize this point:

A little more than three years ago I saw, in consultation with Dr. Price, of Frankfort, Mr. A., aged forty-five. He stated that during his service in the late war he contracted a very severe case of dysentery, which kept him confined to bed for several weeks. During the course of the disease a mass of piles as large as a walnut developed, and has annoyed him ever since by prolapsing and bleeding.

About eight months previous his friends prevailed on him to consult a traveling quack, who was then making periodical visits to Frankfort. He was promised an absolute cure without operation and without pain, and feeling convinced of the so-called physician's powers he consented to try the proposed plan. After six months' treatment, which grew steadily more painful and less satisfactory, he suddenly developed a large swelling in the anal region, which became so intensely painful that he was compelled to leave his business and go to bed.

The suffering grew progressively worse, and after trying his entire stock of home remedies without effect, he sent for Dr. Price. The doctor examined the parts and found a large abscess extending some distance up the bowel, and incised it immediately. While the patient felt much relief from the pain, the operation had been delayed too long, and a very painful and obstinate fistula resulted.

At the time I saw him his condition demanded operation, but he declined every thing in the way of treatment except palliative measures. The nature of his trouble was such that no hope of cure could be held out to him by this method.

He continued treatment under Dr. Price only a few weeks, and although he felt much relief from the pain, he left off altogether because he was not cured. I saw him a few weeks ago (more than three years later), and he assured me that the piles had gotten much larger and gave him more trouble than ever. The fistula is still present. It discharges an irritating watery fluid, which continually bathes the skin and keeps it irritated and raw, while he is kept in constant apprehension of another abscess from the closure of the fistulous openings.

Again, there are cases in which an operation would be the shortest and most satisfactory form of treatment, but on account of their fears the patients can not persuade themselves to submit to the procedure. Under these circumstances, though it may not be possible to remove the disease, a carefully selected simple form of treatment will ameliorate the most distressing symptoms and make the sufferer at least comfortable for a longer or shorter period of time. It may generally be said that the longer the disease has lasted and the greater the amount of organized connective tissue in the pile, the more difficult it will be to remove the trouble by simple means. "Nevertheless, if the disease has not been too long neglected, by perseverance in the plan of treatment" to be briefly outlined, "effectual relief may be obtained."

Much good is often accomplished by a careful regulation of the diet; but it must not be forgotten that by reason of the idiosyncrasies, personal habits and customs, it will not be possible to lay down ironclad rules for this part of the treatment. There is an old adage, that what is one man's meat is another man's poison, and the recognized truth of this will admit only of general rules in the diet. Those things that are almost always harmful and should be avoided will be briefly mentioned in a general way, rather than attempt to suggest what may be taken with impunity.

The patient should not overindulge himself in any kind of food, and this rule should be especially cared for if he is inclined to plethora and past middle age. Food must not be taken that is improperly cooked or highly seasoned, and I mean by high seasoning to refer specially to those articles of diet which contain large quantities of fat, sugar, pepper, and acid. One of the most objectionable of this class, which, by the way, is commonly indulged in by the Southern people, is fried substances, and I am in the habit of specially cautioning my patients against them. From what has been said, the patient will be reminded to always avoid those things which he has learned do not agree with him.

Coarse food and all articles of diet which contain small rough seed, such as oatmeal, graham bread, raspberries, figs, and the like, should under no circumstances be taken. The husks of the grain and the seed are insoluble and, as a matter of fact, indigestible. Passing through the alimentary canal they become imbedded in the fecal mass and are highly irritating to the colon, rectum, and anus. Should the patient be a coffee drinker, it is best to reduce the amount taken to the smallest possible quantity, or, better still, substitute one or two cups daily of weak tea.

Tobacco seems to have a peculiar effect on the rectum, so much so indeed that many smokers have observed that almost as soon as they light their morning cigar the desire to evacu-

ate the bowel manifests itself. While this effect may not be unfavorable under certain diseased or healthy conditions of the parts, it may generally be considered harmful in hemorrhoidal growths. It is therefore desirable that the patient give up tobacco while under treatment for piles.

Alcoholic stimulants should be forbidden entirely. If the patient is not able to leave them off, let him take a little dry sherry, Rhine wine and seltzer, or vichy, or whisky and soda. He should by all means avoid acid drinks, or fermented liquors that contain a certain proportion of sugar, which may become acid after passing into the stomach.

Exercise must be carefully directed and the skin kept in good condition by judicious bathing and brisk rubbing with rough towels or flesh brushes. If the patient is corpulent or plethoric one or two Turkish baths a week may be taken to advantage.

Cushioned seats are frequently objectionable on account of the pressure that is often made against the soft parts and the irritation that sometimes comes on through the perspiration about the anal region. Horseback riding and the use of the bicycle, especially the latter, may act in the same way. The patient should therefore be cautioned against these.

Local cleanliness is a matter of prime importance in any form of treatment for piles. When the bowel has acted the parts should be bathed in cold water, and in subjects who perspire freely, castile soap should be employed to remove all possible source of irritation from the anal region. In some instances a second bath can be taken before retiring with much subsequent comfort to the patient.

All injury or friction from coarse substances used as detergents must be avoided, and the patient should be especially warned against the employment of paper containing printer's ink.

It will be a good plan for the patient to lie down for a short time after each action. This favors the return of the

blood to the general circulation and does away in a great measure with the portal congestion that gravity would induce by the erect position.

The passage of the hardened action over the parts, together with the accompanying straining and the temporary local congestion during the evacuation of the bowels, cause the piles to prolapse, bleed, and become painful. Such condition may often be overcome by securing daily a soft motion. Some form of laxative should therefore be employed. Various drugs are recommended, and in selecting one that is suitable the best rule to follow is to employ the mildest agent that will accomplish the purpose without upsetting digestion or irritating the bowel.

These remedies must be employed with judgment, but in some instances it will not be possible to find the one best adapted to the individual case until several have been tried by administration.

The following formulæ have been found useful:

℞ Pol. sennæ, ... ʒiij;
Rad. glycyrrhizæ, ... ʒiij;
Pul. fruct. fœniculi, ... ʒiss;
Sulph. sublimati, ... ʒiss;
Pul. sacch., ... ʒix.
M. Sig: Teaspoonful night and morning.

℞ Magnesiæ sulph., ... ʒi;
Acid sulphuric dil., ... ♏x;
Ferri sulph. exsiccati, ... gr. i;
Inf. quassiæ, ... ʒi.
M. Sig: Tablespoonful night and morning.

℞ Pill hydrarg., ... gr. iss;
Pul. rhei, ... gr. iss;
Ex. col. co., ... gr. iss;
Ol. juniperi, ... ♏i.
M. Ft. Pill No. 1. M. Sig: Take at bedtime.

℞ Aq. friedrichshall.
Sig: One or two wineglassfuls in hot water while fasting in the morning.

℞ Ex. cascara sag. fl., ... ʒi.
Sig: Twenty or thirty drops twice or thrice a day.

In any instance it will be well to remember that the patient should not be purged, and should the bowel need a preliminary evacuation an injection of warm water and oil will generally be sufficient.

Patients who suffer from piles that bleed freely will very frequently become anemic and require a general tonic sooner or later. Some one of the various preparations of iron should be the essential ingredient of this tonic. However, the main objection to almost all forms of iron is that they invariably produce a tendency to constipation, which is a very serious objection. But this can be overcome by the proper combination with other drugs. A favorite prescription with me in these cases is the Elixir of Three Chlorides, which contains the protochloride of iron, the chloride of arsenic, and the perchloride of mercury. This may be given in conjunction with one of the laxatives already mentioned, or as a vehicle for strychnia, and will form an almost ideal laxative tonic.

Probably the most important part of the non-operative treatment of piles consists of the intelligent employment of local applications. It is here, more than elsewhere, that the surgeon will be called upon to exercise tact, discrimination, and skill.

The matter of first consideration is the nature of the disease, whether it is acute or chronic, and after this attention must be given to the sphincters, anus, rectum, and neighboring organs. In a general way it may be said that if there is inflammation or ulceration, sedative applications will be required, and should there be bleeding or prolapse, astringents will be found most useful. The various groupings of these symptoms, together with the modifications brought about by different complications and the state of the anus and neighboring organs, will call for treatment to meet the indications of the individual case. Of the various sedative applications we have may be mentioned heat and cold, the local use of cocaine, opium, belladonna, hyoscyamus, taraxacum,

conium, iodoform, bismuth, thymol, and what not, used singly or in combination, and employed in the form of injections, ointments, suppositories, or lotions. Thus:

℞ Tr. opii, ... gtt. xxx;
Aquam amyli, ... ℥ij.
M. Sig: Inject.

℞ Ex. belladonnæ, ... grs. xii;
Ex. hyoscyami, ... ʒi;
Ex. conii, ... ʒss;
Ung. petrolati, ... ℥i.
M. Sig: Apply locally for pain.

℞ Morph. sulph., ... gr. ⅓;
Iodoform, ... grs. v;
Theobromæ, ... q. s. ad.
M. Ft. Suppository No. i. M. Sig: Introduce night and morning.

℞ Liq. plumb. subacetati, ... ℥i;
Tr. opii, ... ʒiv.
M. Sig: Teaspoonful to a wineglass of water and apply night and morning. (Allingham.)

Or as astringents:

℞ Acid tannici, ... ʒi;
Ung. petrolati, ... ℥i.
M. Sig: Apply locally.

℞ Ferri persulph., ... gr. i;
Theobromæ, ... q. s. ad.
M. Ft. Suppos. No. i. Sig: Introduce.

℞ Alum sulph., ... ʒi;
Aquæ font., ... Oi.
M. Sig: Inject.

The space at my disposal will not admit more than mention of the various methods that may be employed, with the forms of treatment already mentioned or independent of them, as the case may require.

Brodie, Curling, and Kelsey speak most highly of injecting cold water into the rectum, and this may prove very efficacious when combined with the proper general treatment. As now practiced and advocated by Van Buren, the procedure consists of injecting about a pint of lukewarm water into

the rectum just after breakfast. This softens and brings away the action, after which four to eight ounces of cold water is thrown into the bowel and retained there as long as possible.

In the consideration of the other simple methods the names only will be mentioned of some of the most important ones that have gained recognition and a position among the orthodox plans of treatment.

1. Hypodermic use of the ethereal solution of iodoform.

2. The hypodermic use of liquid phenol combined with various other drugs, in strength varying from five to twenty per cent.

3. Galvanism according to Shoemaker.

4. Electrolysis after the method of Bacon.

5. Peri-marginal ignipuncture.

6. Bloodless massage.

7. Punctee cauterization with the various modifications advised in the past few years.

COLLOID CANCER.

By F. J. YAGER, M. D.
Campbellsburg, Ky.

The subject of this short sketch I have known for about forty-three years, and have always regarded her as a scrofulous constitution. She had a large running ulcer under her arm from her girlhood, involving the axillary glands. I had treated her often for various diseases, especially for scrofula. It made its appearance at different times in different parts of the body, sometimes attacking the eyes and sometimes the limbs, but this last attack was made on the abdominal organs in a very malignant form. When I was first called to see her, in this last attack, I found her with a pulse about 90, temperature 100.5° to 102°, and the abdomen as tight as a drum, without a resonant sound anywhere to be found over its whole area, but seemingly as solid as a sack filled with sand. Had eaten but little for quite a number of weeks, and entirely without appetite, and had not had an action from the bowels for about two months, and suffering intensely from the severe tension of her abdominal walls and pressure of the whole internal organs, and, with the occasional emesis, rendered her condition critical. I tried in every way to obtain an action from the bowels, but to no purpose.

Godlee says colloid cancer is most frequently found in the abdominal cavity attacking the internal organs and the peritoneum, and its malignity is shown chiefly by the rapidity in which it involves other surrounding organs and tissues. It thus forms, primarily, tumors of enormous size. It causes death in most all the cases by attacking other organs and

interfering with their functions, causing severe derangements of vital action. This character of cancer seems to be nearest like the cancer which caused the death of my patient.

I called Dr. M. H. Taylor in consultation, and after a careful examination it was concluded that an operation was demanded, and in accordance with that understanding Dr. L. S. McMurtry was called, and on the following day the abdomen was opened, and nearly or quite all of the organs in it were involved in the disease, which to all appearance was colloid cancer. It was evident that nothing could be done, and the abdomen was closed and the patient made as comfortable as possible. Death ensued twelve hours after the operation. The patient was sixty years old at the time of her death.

KENTUCKY STATE MEDICAL SOCIETY.

FORTIETH ANNUAL MEETING, HELD AT HARRODSBURG, KENTUCKY, JUNE 12, 13, AND 14, 1895.

FIRST DAY—*Afternoon Session.*

The Society convened in the court-house, and was called to order at 1 P. M. by the President, Dr. J. B. Marvin, of Louisville.

Prayer was offered by the Rev. Dr. W. O. Goodloe, of Harrodsburg.

The Hon. Ben Lee Hardin delivered the address of welcome.

The report of the Committee of Arrangements was read by the Chairman, Dr. E. M. Wiley.

Mr. President, Gentlemen of the Kentucky State Medical Society:

On behalf of the Committee of Arrangements, composed of the County Society, I bid you a hearty welcome. When on my return from the meeting last year I announced that the State Society would meet here at its next session, everybody was delighted. That the Society had not been invited here before was due to limited hotel accommodations. We decided to not allow this to stand in our way any longer, but to open our homes to the profession of the State. The latch-string is now on the outside, not alone of the profession, but of all our citizens. We have not followed the time-honored custom in the preparation of the programme of this meeting, but have departed from some of the long-established rules, especially in the social features that have characterized the meetings in the past. The Old Guard who have so faithfully and eloquently served us in the past as speakers, positively refused to do further duty in that line. Your committee were at sea, and could think of no remedy but a clean, aseptic operation. Dr. A. D. Price gave the anesthetic, and the banquet is no more.

It has been the aim of the committee to devote all the time possible to the scientific work as laid out in the programme. The only special feature outside the programme will be a reception given the State Society by the County Society at the residence of Dr. and Mrs. Price, immediately after the evening session on Thursday. The members of the State Society and their families, visiting physicians, and invited guests will repair to Dr. Price's residence at that time.

All the railroads operating lines in the State have agreed to a one and one third fare to this meeting, on the certificate plan. Members should not fail to have Dr. Bailey, Permanent Secretary, sign their certificates.

Morning sessions will convene promptly at 9 o'clock, and adjourn at 12. Afternoon sessions open at 2 o'clock, and close at 6.

The session at the Opera House will commence promptly at 8 o'clock P. M.

The order of business will be found in the official programme.

Members when registering should not fail to secure invitations to the reception on Thursday evening.

Permanent Secretary Dr. Steele Bailey read his report as follows:

Mr. President, Gentlemen of the Kentucky State Medical Society:

Your Secretary in reporting to the fortieth annual session speaks not to opinions but to facts. It is with right much pleasure he informs the Society that if there was anything to indicate we are not progressing, the intense interest which has been manifested by the profession of the State concerning this conclave in the historic city of Harrodsburg would be evidence enough of the Kentucky doctor's *esprit de corps* and his loyalty to his chosen calling. Contrary to the usual order of things applications for membership have been coming in for more than a month past.

The outside demand for the programme has been beyond our capacity to furnish, and several calls in and some beyond the confines of the State have been received from non-members by the Secretary for the purchase of the recently issued volume of Transactions, all of which is very gratifying, and indicates in no uncertain voice that by vigilance and hard, scientific work (cer-

tainly evinced in Volume 3, new series), that, as an organized medical body, we are of importance and the peer of any. There can be no disloyalty in admitting what must now be indisputable.

The volume has been distributed to all members in good standing, to all affiliating State Medical Societies, to the State Boards of Health, and to the Army Medical Bureau. Many encomiums from the States have been expressed concerning the new book, particularly the incomparable discussions embraced therein.

Alive to our virtues, we may have some vices which suggests the following: While it has been disappointing to a few, which we regret, yet some valuable lessons may be learned from the delay in getting out tome 3. It has been made manifest that something more than the preaching of an apostle is sometimes indispensably necessary. Unless contributors to the Transactions send their papers promptly, in legible, grammatical form, "boiled down" and ready to be "set up," it is apparent that too much pencil writing is entailed upon the editor, a labor from which he shrinks, because it is a time as well as a mental and muscle consumer. A great deal of the delay in the issuance of Volume 3, came from tardiness and the failure of members to have their papers and discussions properly prepared for the printer. A hint to the wise thus will prevent a recurrence. The volume for 1895 will be gotten out quickly, and everybody in a happy humor. As a Society we have, semi-occasionally, gotten into debt, and we have had a happy knack of getting out of such discomfort on all occasions; so it will be like the tintinnabulation of sweet bells for you to know that now we are free from bonds. This is pleasing, and you are entitled to a reasonable amount of self-adulation. The Treasurer will set forth the facts in his report to-day.

Without promptness in the payment of the annual dues, your Secretary and Treasurer can not hope to keep the name of your Society, the representative one of this Commonwealth, a synonym for probity, and a fellowship in it always at par value.

The Secretary then read the following report of the Treasurer:

Mr. President, Gentlemen of the Kentucky State Medical Society:

It gives me pleasure to announce that we have a balance in the treasury, and would always have sufficient to pay all indebtedness if three fourths of our membership would promptly settle

their dues. The hard times have had an unsalutary effect upon the profession; money has been scarce, consequently many of the names of members have been dropped from our roster from failure to meet our demands. With the improvement in all branches our profession will be benefited. We trust the time may come when it will not be necessary to send "gentle reminders" to any member for the collection of dues.

We beg to submit the following:

COLLECTIONS.

Dues collected at Shelbyville,	$501 00	
Dues collected since last meeting,	137 25	
		$638 25

DISBURSEMENTS.

Secretary's salary,	$100 00	
Secretary's expenses,	27 50	
Stenographer,	67 50	
J. P. Morton & Co., programmes,	28 50	
W. P. Walton, printing,	15 00	
Stamps and stationery—Secretary,	5 35	
Stamped envelopes,	6 80	
J. R. Marrs, printing,	3 00	
Stamps and stationery—Treasurer,	3 35	
Balance J. P. Morton & Co., Transactions, 1893,	198 00	
		455 00
Balance in treasury,		$183 25

The President stated that these reports would take the usual course.

The Permanent Secretary read several applications for membership, which were favorably acted upon.

The regular order was next proceeded with, and the following symposium of papers on diphtheria were read:

Sanitation of Diphtheria, by Dr. William Bailey, of Louisville.

Pathology and Bacteriology of Diphtheria, by Dr. Carl Weidner, of Louisville.

Clinical Diagnosis and Local Treatment of Diphtheria, by Dr. W. B. McClure, of Lexington.

Sequelæ and General Treatment, by Dr. Thomas Hunt Stucky, of Louisville.

Serum Treatment of Diphtheria, by Dr. William Cheatham, of Louisville.

The discussion of this series of papers was opened by Dr. J. Y. Oldham, and continued by Drs. Dabney, Larrabee, Mathews, Weidner, McClure, and Cheatham.

Dr. John Young Brown, of Lakeland, read a paper entitled Some Further Observations on Pelvic Disease and Its Relation to Insanity in Women, with Report of Cases, which was discussed by Drs. McMurtry, Stone, Grant, Lewis, Dixon, and in closing by the essayist.

Dr. J. M. Foster, of Richmond, followed with a paper on Diagnosis of Presentation by Abdominal Examination, which was discussed by Drs. Wilson and Weidner.

On motion the Society adjourned until 8 P. M.

Evening Session.

The Society reassembled at 8 P. M. in the Harrodsburg Opera House.

President Marvin delivered his annual address.

Dr. Joseph M. Mathews, of Louisville, followed with a popular address on The Public Health.

On motion of Dr. Wathen, a vote of thanks was extended to both the President and Dr. Mathews for their learned and interesting addresses.

On motion the Society adjourned until Thursday morning, 9 o'clock.

SECOND DAY—*Morning Session.*

The Society met at 9 A. M., and was called to order by the President.

Under the head of Miscellaneous Business, the first order was an amendment offered to the Constitution last year, which reads as follows:

Resolved, That Section 2, Article IV, of the Constitution, now revoked by resolution as recorded on page 10, Volume I of the Transactions, new series, be restored to read thus: Each officer

shall be elected after recommendation by the Nominating Committee, which committee shall be appointed by the President, and shall consist of one member from each county represented, except Jefferson County, which shall have four members on said committee. The election shall take place at the annual meeting of the Society, on the third day of the session during the morning business hour, and each officer shall serve one year or until the election of his successor.

On motion this resolution was tabled, there being twenty-six votes for and seventeen votes against tabling it.

The Permanent Secretary read a communication from Mr. J. W. Gale, Secretary of the Kentucky Pharmaceutical Association, conveying greetings of sympathy and interest in all matters of mutual interest pertaining to the welfare of the Society.

The following were appointed delegates from the Kentucky Pharmaceutical Association: C. S. Porter, Somerset; E. W. Lillard, Lancaster; W. G. White, Richmond.

The President: Without objection, the Chair will invite the gentlemen whose names have been mentioned to take seats on the platform. I will state in this connection that I received a similar communication from the Secretary of the Kentucky Pharmaceutical Association, asking us to appoint delegates to their meeting to be held at Mammoth Cave. We have no members of the Society resident at Mammoth Cave or in the immediate vicinity of it, but I wrote Dr. McCormack, of Bowling Green, and Dr. McChord, of Lebanon, asking them to appear before the meeting as delegates from this body.

Dr. W. L. Rodman: While in Philadelphia three weeks ago I was talking to Dr. W. W. Keen, the National Chairman of the Gross Monument Fund, and he stated they were in need of more money before giving the contract for the monument that is to be erected to Professor Gross in the City of Washington. He felt that Kentucky, the adopted home of Professor Gross, which really claimed him, had hardly done its duty

in the matter, and he urged me to bring it up again at this meeting of the Society, so that those who have not contributed might do so. The matter was not brought up at the Frankfort meeting on account of the hard times, and we thought we would wait another year. I feel we ought to do something in this matter, and I am sure the members will be glad to help the cause along in every way they can, and the Society ought to take some action. They want to spend $9,000 on the monument, and they have raised $4,000 or $5,000. Congress gave $1,500, and they want enough more to make $9,000.

Dr. H. Brown: I move that a committee be appointed, with Dr. Rodman as chairman, to formulate the matter and present it to the members.

Dr. McMurtry: I second that motion. Dr. Gross was one of the founders of this Society; he took an active interest in it, and was ready to respond to any invitation of the Society, and I am sure there are a large number of the members will want the privilege of taking part in the honor that is being done him, and I therefore heartily support the motion of Dr. Brown.

Carried.

The Chair appointed on this committee Drs. Rodman, Brown, and McMurtry.

Dr. Dudley S. Reynolds moved that a committee of three be appointed to collect all Resolutions, Constitution, and By-laws, and Ordinances of the Society, and codify them in suitable and proper form to be presented for final adoption at the earliest moment convenient.

Seconded and carried.

The President stated he would announce the committee later.

Dr. W. L. Rodman then read a paper entitled Anatomy and Radical Cure of Hernia.

The paper of Dr. W. O. Roberts, of Louisville, on The Diagnosis and Treatment of Strangulated Hernia, was read by title.

Dr. John M. Foster opened the discussion on Dr. Rodman's paper, which was continued by Drs. Davis, Cowan, Dugan, Vance, Grant, and in closing by the essayist.

Dr. Fred C. Henry, of Philadelphia, read a paper entitled Chlorosis and Its Treatment, which was discussed by Drs. Lyman Beecher Todd, Larrabee, Pope, and in closing by the essayist.

Dr. Louis Frank, of Louisville, contributed a paper on Treatment of Puerperal Sepsis. Discussed by Drs. McMurtry, Dixon, Wathen, Dugan, and in closing by the author.

Dr. Curran Pope, of Louisville, followed with a paper entitled Some Reflections on the Therapeutics of Nervous Diseases.

Several applications for membership were then read, and on motion the Secretary was instructed to cast the ballots, and they were declared duly elected.

Dr. J. N. McCormack: The State Board of Health realizes how fully its success depends upon the approval and indorsement of this Society, and it was with special pleasure that I heard the valuable suggestion made by the President last evening in his address, urging the appointment of a committee on Public Policy, to co-operate with the State Board of Health in its work, and as a representative of that Board I move that the Chair be authorized to appoint a committee of five to serve in that capacity for the coming year.

Dr. Larrabee: I second the motion. In our deliberations last evening we did not go quite far enough in the indorsement of the papers read on that subject, and I want to say that the indorsement of this Society should be sent to Dr. Comegys, of Cincinnati. I would say a resolution covering that point was passed, and ought to be passed again, memorializing the proper authorities and expressing as the sentiment of the Kentucky State Medical Society that it is in favor of a Cabinet Health Officer. This question was up last

year, and it ought to go on continuously until it is obtained, or until a Cabinet Officer is appointed.

Dr. McCormack: I accept the suggestion with pleasure to send such a communication to Dr. Comegys, the chairman of the committee.

Carried.

Afternoon Session.

The Society reassembled at 2 P. M., and was called to order by the President.

The first thing in order was the appointment and announcement of the Nominating Committee.

Dr. H. J. Cowan, of Danville, read a paper entitled A Case of Monocular Albuminuric Retinitis: Recovery.

Dr. J. Morrison Ray, of Louisville, followed with a paper entitled The Blind of Kentucky.

Dr. H. H. Grant, of Louisville, contributed a paper on The Comparative Value of Mechanical Devices in Making Intestinal Anastomosis, and Dr. August Schachner, of Louisville, one on Modern Methods of Intestinal Anastomosis. Discussed by Dr. Grant.

Dr. Mathews: The President of the American Public Health Association is with us and desires to extend an invitation to the members of this body to attend their forthcoming meeting in Denver.

Dr. William Bailey: The American Public Health Association was organized in 1872. You know that hygiene is comparatively a new science. When Massachusetts organized its State Society, in 1872, this Association was formed, and under its work and stimulus almost every State in the Union and every city had their health organizations, and now the Association has extended its work to Canada and even Mexico. Hence it is an International Association, and one of the largest sanitary bodies in the world, having a membership of from 1,000 to 1,500. Its members come from every State in the Union, as well as from Canada and Mexico. Our

meeting will be held the first four days in October in the city of Denver. It will make a delightful trip, and as President of the Association I extend to you a cordial invitation to attend the meeting.

Dr. Henry E. Tuley, of Louisville, read a paper entitled Care of the Newborn, which was discussed by Drs. Weidner, Ray, and Carpenter.

Dr. M. F. Coomes, of Louisville, read a paper entitled Stricture of the Esophagus. Discussed by Dr. Frank.

Dr. George S. Davis, of Salvisa, contributed a paper on the Treatment of Pneumonia.

Dr. J. G. Carpenter, of Stanford, followed with a paper on Abdominal Surgery in the Country.

A paper on Milk Sickness was read by Dr. George W. Beeler, of Clinton.

Dr. S. G. Dabney, of Louisville, read a paper entitled Phlyctenular Ophthalmia. Discussed by Drs. Carpenter, Ray, Taylor, Beeler, Yager, and in closing by the essayist.

Dr. Frank C. Wilson, of Louisville, read a paper entitled The Dangers of Chloroform Anesthesia: How to Avoid and Overcome Them. Discussed by Drs. Harwood, Greenley, Beeler, Tuley, Lapsley, Weidner, Yager, and in closing by the author of the paper.

Dr. J. N. Baughman, of Flat Lick, read a paper entitled A Few Crumbs About Typhoid Fever.

On motion the Society adjourned until 8 P. M.

Evening Session.

The Society reassembled at 8 P. M. at the Harrodsburg Opera House, and was called to order by Second Vice-President Baughman.

Dr. A. W. Hitt, of Louisville, delivered a lecture on Leprosy, which was illustrated with the stereopticon.

Dr. Lyman Beecher Todd was then introduced, and delivered an eloquent address entitled Concerning a Generation of Kentucky Physicians: A Reminiscence.

Dr. Dudley S. Reynolds, of Louisville, followed with an address entitled The Ethics of Our Profession.

At the close of the session the Society repaired to the residence of Dr. Price, where a reception was held.

THIRD DAY—*Morning Session.*

The Society met at 9 A. M., and was called to order by the President.

The President announced the following committees for the ensuing year:

Board of Censors—H. Brown, Frank C. Wilson, and E. E. Hume.

Committee to Revise and Codify Constitution and By-laws—Dudley S. Reynolds, L. S. McMurtry, and Steele Bailey.

Committee on Publication—M. F. Coomes, Henry E. Tuley, and H. A. Cottell.

Committee to Select Essays and Discussions—T. B. Greenley, W. L. Rodman, and J. M. Harwood.

Committee on Public Policy—W. H. Wathen, H. K. Thompson, J. M. Poyntz, C. H. Todd, and David Barrow.

Dr. Bailey: In keeping with the recommendations of the President's address, I move that a committee be appointed looking toward the organization of County Medical Societies in the State. Carried.

The President: I will appoint on that committee Drs. Steele Bailey and J. N. McCormack.

The Committee on Nominations reported through its Chairman, Dr. Aiken, as follows:

President—Dr. John A. Lewis, Georgetown.
First Vice-President—Dr. H. H. Grant, Louisville.
Second Vice-President—Dr. O. S. Kash, Moorefield.
Permanent Secretary—Dr. Steele Bailey, Stanford.
Treasurer—Dr. J. B. Kinnaird, Lancaster.
Librarian—Dr. Frank Boyd, Paducah.
Place of Meeting—Lebanon.
Chairman of Committee of Arrangements—Dr. R. C. McChord, Lebanon.

On motion the report was adopted.

The President appointed as a committee to escort the President elect to the Chair, Drs. Lyman Beecher Todd and William Bailey.

Dr. Lewis was then introduced by the retiring President. He said:

Mr. President and members of the Kentucky State Medical Society: I feel that this occasion calls for a few words on my part, and if this faltering tongue of mine should fail in one single articulate sound, still every lineament of my countenance would bespeak my gratitude to this body of my distinguished *confrères* for the high honor conferred upon me to-day, in electing me to the first position within the gift of this Society. When I reflect upon the names of the eminent men who have preceded me in the Chair,—grand men, grand physicians, men of ability and of science,—I am deeply impressed with my own unfitness for the position. While I accept the honor, I do so humbly, believing that all of you will stand ever ready to cast the mantle of charity over my failures. I promise you to faithfully discharge the duties that devolve upon me to the limited ability with which I am endowed. Lastly, I shall ever hold in grateful remembrance this event and this hour. Again I thank you. [Applause.]

The President: We have with us this morning a senior surviving ex-President of this body, a man whose presence is an inspiration to young men—Dr. Baker, of Shelbyville. I will invite him to the stage. [Applause.]

The President then called the regular order, the first thing being a series of papers on obstetrical subjects, as follows:

Ante-Partum and Post-Partum Hemorrhage, by Dr. A. D. Price, of Harrodsburg.

Craniotomy, Symphyseotomy, Cesarean Section, by Dr. John G. Cecil, of Louisville.

Extra-Uterine Pregnancy, by Dr. David Barrow, of Lexington.

The discussion on these papers was opened by Dr. J. M. Harwood, and continued by Drs. McChord, Carpenter, H. Brown, William Bailey, Greenley, Yager, Herndon, Frank, and in closing by the essayists.

Dr. Lyman Beecher Todd offered the following resolutions:

Resolved, That the thanks of the Kentucky State Medical Society, now in the fortieth annual session in Harrodsburg, be tendered to Dr. J. B. Marvin for the dignified, prompt, impartial, and kind manner in which he has discharged the delicate and difficult duties of the presiding officer.

That to the citizens of this time-honored and historic old city of Harrodsburg, and especially to the ladies, the heartfelt thanks of this Society is hereby returned for universal kindness and generous hospitality extened to us, rendering our visit delightful and memorable.

To Rev. and Mrs. W. O. Goodloe for their pleasant reception of Wednesday afternoon.

To the Mercer County Medical Society and to Dr. and Mrs. A. D. Price for the very charming and enjoyable reception on Thursday evening.

To the Committee of Arrangements, whose efficiency and thoughtfulness have left nothing undone to contribute to our comfort and to render our meeting here eminently successful.

To the press of Harrodsburg for pleasant notices of our meeting both before and during the meeting.

To the railroads to Harrodsburg for reduction of fares on their respective roads.

Dr. T. C. Evans, of Louisville, read a paper on Adenoid Growths of the Naso-Pharynx, which was discussed by Dr. Carpenter.

Dr. T. B. Greenley, of Meadow Lawn, read a paper entitled The Prevention and Treatment of Pulmonary Tuberculosis. Discussed by Dr. Weidner, and in closing by the author of the paper.

Dr. Francis M. Greene, of Lexington, read a paper on The Leucocytes in Diseases of Microbic Origin.

The following papers were read by title and referred to the Committee on Publication:

Treatment and Protection for the Eye After Operation for Cataract, by Dr. P. Richard Taylor, of Louisville.

Diagnosis and Treatment of Strangulated Hernia, by Dr. W. O. Roberts, of Louisville.

The Indications for Operation in Puerperal Sepsis, by Dr. L. S. McMurtry, of Louisville.

Rectal Diseases as a Specialty, by Dr. Joseph M. Mathews, of Louisville.

Uterine Hemorrhage, by Dr. J. H. Letcher, of Henderson.

Present Status of Intestinal Anastomosis, by Dr. Ap Morgan Vance, of Louisville.

Manifestations of the Rheumatic State in Childhood, by Dr. Samuel E. Woody, of Louisville.

A Plea for the More Frequent Use of Caustics in the Treatment of Epithelioma, with Remarks on the Use of Lactic Acid, by Dr. I. N. Bloom, of Louisville.

The Chemical Changes in the Stomach as a Cause of Disease, by Dr. W. Carroll Chapman, of Louisville.

Parasitic Diseases of the Skin (Vegetable), by Dr. W. R. Blue, of Louisville.

The Most Suitable American Climate for Consumptives, by Dr. A. H. Stewart, of Richmond.

Observations in Ophthalmic Practice, by Dr. W. B. Meany, of Louisville.

Unique Case of Strangulated Hernia, by Dr. J. V. Prewitt, of West Point.

Four Cases of Successful Nerve Stretching, by Dr. J. G. Carpenter, of Stanford.

The following are the delegates appointed to attend the American Medical Association meeting at Atlanta, 1896:

David Barrow, Lexington; B. L. Coleman, Lexington; Lyman Beecher Todd, Lexington; T. B. Greenley, Meadow Lawn; A. D. Price, Harrodsburg; E. M. Wiley, Harrodsburg; H. Brown, Hustonville; J. M. Mathews, Louisville; Carl Weidner, Louisville; L. S. McMurtry, Louisville; Dudley S. Reynolds, Louisville; Thos. P. Satterwhite, Louisville; A. Morgan Vance, Louisville; H. H. Grant, Louisville; A. M. Cartledge, Louisville; John G. Cecil, Louisville; William Bailey, Louisville; J. M. Ray, Louisville; J. N. McCormack, Bowling Green; E. E. Howe, Frankfort; Ed Beeler, Clinton; J. B. Kinnaird, Lancaster; J. M. Harwood, Shelbyville; J. M. Baker, Shelbyville; C. C. Lewis, Stamping Ground; R. C. McChord, Lebanon; W. H. Coffman, Georgetown;

J. M. Foster, Richmond; J. N. Baughman, Flat Lick; H. K. Adamson, Maysville.

There being no further business before the Society, on motion, the Society was declared adjourned to meet in Lebanon, 1896, at a date to be announced by the Committee of Arrangements.

STEELE BAILEY, M. D.,
Permanent Secretary.

ROSTER.

The italicized names are those of members elected in 1895.

Adamson, H. K., Maysville.
Agnew, P. L., Sebree.
Aitken, C. W., Flemingsburg.
Albright, Granv. H., Barboursville.
Alcorn, Edward, Hustonville.
Alexander, John B., Mason.
Alexander, S. C., Owingsville.
Allan, B. A., Louisville.
Allen, S. S., Lexington.
Anderson, Turner, Louisville.
Atkins, Henry S., Russell Cave.
Atkins, W. L., Lexington.
Austin, Curtis A., Flagfort.
Bagby, D. M., Walton.
Bailey, Steele, Stanford.
Bailey, William, Louisville.
Baker, J. M., Shelbyville.
Banta, Will P., Louisville.
Barbour, Philip F., Louisville.
Barron, David, Lexington.
Baughman, J. N., Flat Lick.
Beard, E. T., Todd Point.
Beard, Frank M., Shelbyville.
Beard, W. F., Shelbyville.
Becket, J. R., Powersville.
Beeler, George W., Clinton.
Betchel, John T., Poole's Mills.
Birchett, John G., Croppers.
Black, James M., Red House.
Blaine, A. D., Dry Ridge.
Bland, T. E., Shelbyville.
Blanding, Abraham S., Walnut Hills.
Blanford, C. T., St. Mary's.
Bloom, I. N., Louisville.
Blue, W. R., Louisville.
Bodine, J. M., Louisville.
Bogle, John C., Danville.
Boggess, Walter F., Louisville.
Bosworth, Lewis N., Lexington.
Bowen, D. C., Nolyn.
Boyd, Frank, Paducah.
Brice, J. C. S., Poplar Plains.
Brooks, John G., Paducah.
Brown, H., Hustonville.
Brown, John Young, Lakeland.
Brown, Joseph Thos., Clintonville.
Brown, W. A., Parksville.
Bryan, Joseph, Lexington.
Buchanan, James B., Campbellsville.
Buckner, W. T., Shelbyville.
Bullock, T. S., Louisville.
Bullock, W. O., Lexington.
Butler, Thomas L., Louisville.
Butt, A. L., Franklin.
Barker, James C., Dunnville.
Barnes, J. Robert, South Carrollton.
Beuchel, Valentine, Louisville.
Caldwell, R. C., Bloomfield.
Carpenter, J. G., Stanford.
Carrick, J. G., Lexington.
Cartledge, A. M., Louisville.
Cartwright, H. L., Junction City.
Cartwright, H. P., Bowling Green.
Cecil, John G., Louisville.
Cheatham, William, Louisville.
Chenoweth, James S., Louisville.
Chinn, George W., Frankfort.
Cinnamond, M. Miller, Hatton.
Clarke, F. H., Lexington.
Coffman, W. H., Georgetown.
Coleman, B. L., Lexington.
Coleman, W. W., Mt. Washington.
Collins, Moses, Lakeland.
Contri, Louis G., Bedford.
Coombs, Sam. W., Bowling Green.
Coomes, M. F., Louisville.
Coons, T. C., Chilesburg.
Cottell, H. A., Louisville.

Cowan, Harry J., Danville.
Creel, M. P., Central City.
Crosby, J. A., Shelbyville.
Dabney, S. G., Louisville.
Dade, Waller H., Frankfort.
Dalton, J. M., Harrodsburg.
Daugherty, Thos. H., Sadieville.
Davies, Frank, Simpsonville.
Davis, George Edwin, Salvisa.
Demaree, Owen, Benson Depot.
Dixon, Archibald, Henderson.
Dixon, Archibald, jr., Henderson.
Doherty, W. B., Louisville.
Duerson, Charles B., Mt. Sterling.
Dugan, W. C., Louisville.
Duncan, Charles T., Duncan.
Dunlap, Fayette, Danville.
Dunn, M. C., Henderson.
Davis, H. C., Harrodsburg.
Demaree, Joseph S., Mackville.
Eager, Benjamin F., Hopkinsville.
Ely, James R., Frankfort.
Ely, William E., Frankfort.
Evans, J. B., Riley.
Evans, Silas, Lexington.
Evans, Thomas C., Louisville.
Falconer, Richard C., Lexington.
Fallis, Robert G., Louisville.
Ferguson, R. V., Haydonville.
Floyd, William, Mannville.
Foster, John M., Richmond.
Frank, Louis, Louisville.
Freeman, J. A., Beard.
Frey, R. Wesley, Trenton.
Fulton, Gavin, Louisville.
Feland, John M., Reynoldsville.
Forsythe, M. L., Harrodsburg.
Garner, William F., Humphrey.
Garr, C. R., Flemingsburg.
Gibson, H. R., Richmond.
Gilbert, R. B., Louisville.
Givens, Lamme S., Cynthiana.
Goodman, Henry M., Louisville.
Grant, H. H., Louisville.
Grant, J. W., Petersburg.
Green, E. M., jr., Louisville.
Green, F. M., Greendale.
Green, Walter O., Louisville.
Greenley, T. B., West Point.
Griffin, T. H., Henderson.
Griffiths, George W., Louisville.
Griffiths, W. M., Louisville.
Griswold, Alex. V., Louisville.
Groves, Charles J., Beuchel.
Gudgell, Frank P., Owingsville.
Guest, J. W., Louisville.
Guthrie, William A., Franklin.
Hanna, W. M., Henderson.
Hart, H. C., Winchester.
Harvey, C. W., Louisville.
Harwood, Charles P., Shelbyville.
Harwood, J. M., Shelbyville.
Hays, John Edwin, Louisville.
Hays, T. A., Fairmount.
Helm, S. L., Spears.
Henderson, Peyton R., Louisville.
Herndon, Ben. F., Barboursville.
Herring, Henry C., Lancaster.
Hertzsch, Della, Louisville.
Heuser, Henry, Louisville.
Hickey, C. W., Flemingsburg.
Hobson, Willis W., Harrod's Creek.
Hodge, J. A., Henderson.
Holloway, J. W., Keene.
Holloway, Sam. W., Louisville,
Holloway, Uriah G., Troy.
Holmes, B. L., Carrollton.
Holsclaw, John R., Zoneton.
Hopson, Joseph, St. Matthew's.
Horine, G. Z., Graefenberg.
Hower, T. J., Cropper.
Huddleston, J. W., Murphysville.
Hume, E. E., Frankfort.
Hitt, A. W., Louisville.
Ingram, Julia C., Louisville.
Irvine, W. E., South Carrollton.
Irwin, J. W., Louisville.
Jackson, A. W., Earlington.
James, Samuel E., Frankfort.
Jamison, W. E., Eminence.
Jenkins, J. O., Newport.
Jesse, Geo. M., North Pleasureville.
Jesse, J. F., North Pleasureville.
Johnson, Calvin R., Waddy.

Johnson, J. E., Zion.
Joyes, Crittenden, Louisville.
Kaelin, F., Louisville.
Kash, Oliver S., Moorefield.
Kavanaugh, C. W., Lawrenceburg.
Keen, W. C., Albany.
Kelly, C. W., Louisville.
Kelly, George D., Lexington.
Kelly, J. H., Mayslick.
Kennedy, O. A., Richmond.
Kenyon, F. P., Middlesborough,
Kincaid, J. W., Catlettsburg.
Kinnaird, J. B., Lancaster.
Kinnaird, Thomas H., Lexington.
Kirk, W. R., Louisville.
Knox, David B., Newton.
Larrabee, J. A., Louisville.
Lassing, H. C., Union.
Laurence, Annie F., Louisville.
Leak, J. K., New Haven.
Leaming, S. E., Stanton.
Leathers, Charles A., Lawrenceburg.
Lee, James R., Columbus.
Letcher, J. Hughes, Henderson.
Lewis, C. C., Stamping Ground.
Lewis, John A., Georgetown.
Lieber, A. J., Henderson.
Lillard, G. D., Lawrenceburg.
Long, John L., Louisville.
Lowry, John C., Troy.
Luckett, E. H., Owensboro.
Lapsley, Frank Lee, Louisville.
Lapsley, J. P., McAfee.
Layton, Charles W., Rockport.
Lyon, John B., Kirkwood.
Maddox, J. D., Rockport.
Mann, Charles M., Nicholasville.
Mansfield, Cassius D., Stanton,
Marshall, Ewing, Louisville.
Martin, W. M., Kingston.
Marvin, J. B., Louisville.
Mathers, Chas. W., Head Quarters.
Mathews, J. M., Louisville.
McChord, R. C., Lebanon.
McClure, W. B., Lexington.
McCormack, J. N., Bowling Green.
McDowell, Harvey, Cynthiana.
McDowell, James L., Central City.
McDowell, Lucien, Flemingsburg.
McMurray, Thos. J., Lawrenceburg.
McMurtry, L. S., Louisville.
McNue, Nelson H., Carlisle.
Meek, J. M., Morgan.
Meek, Harrison D., Claysville.
Meredith, Thomas O., Burgin.
Metcalfe, John H., Louisville.
Miles, Abraham M., Harvieland.
Milliken, W. B., Rockfield.
Morris, William E., Southville.
Morrison, A. M., Goshen.
Moss, Virgil U., Rockfield,
Mathews, W. H.
McClain, Hugh L., Wilmore.
Monaugh, T. L., Bohon.
Mounsey, George T., Louisville.
Nelson, W. C., Salvisa.
Norment, Henry T., Anthoston.
Nunnelly, Henry C., Ford.
Nutall, Wm. L., New Castle.
O'Conner, John W., Elizabethtown.
Oldham, John Y., Lexington.
O'Neal, W. S., Lancaster.
Ouchterlony, John A., Louisville.
Oldham, Ira Brown, Speedwell.
Pack, John E., Georgetown.
Parker, J. H., Corbin.
Parker, J. W. F., Somerset.
Patterson, Thos. L., Lexington.
Peck, D. D., Helena.
Pelle, H. E., Louisville.
Pennington, J. R., Louisville.
Perkins, George, Somerset.
Perrin, J., Simpsonville.
Phillips, G. M., Maysville.
Phillips, William E., Wyoming.
Phythian, J. L., Newport.
Pierce, E. L., Louisville.
Pitman, H. L., East Bernstadt.
Plummer, H., Harrodsburg.
Pope, Clarence T., Louisville.
Pope, Curran, Louisville.
Pound, T. P. D., Wilsonville.
Powell, Hugh Baker, Corydon.
Powell, J. N., Corydon.

Powell, W. D., Harrodsburg.
Powers, James G., Fairfield.
Poyntz, James M., Richmond.
Pratt, R. D., Shelbyville.
Prewitt, James V., West Point.
Prewitt, Nelson V., Winchester.
Price, Ancil D., Harrodsburg.
Price, Joseph L., Sherman.
Pryor, J. W., Lexington.
Purdom, J. F., Louisville.
Pusey, D. C., Brandenburg.
Pusey, H. M., Louisville.
Pusey, Henry K., Louisville.
Poyntz, C. Edwin, Waco.
Quinn, William A., Henderson.
Ramsey, R. T., London.
Ray, J. Morrison, Louisville.
Ray, W. R., Chestnut Grove.
Reddick, James T., Paducah.
Reddish, George M., Somerset.
Reynolds, Dudley S., Louisville.
Reynolds, O. H., Bagdad.
Richmond, W. W., Clinton.
Riley, F. F., Anchorage.
Ritter, H. B., Louisville.
Roberts, Harvey H., Paris.
Roberts, W. O., Louisville.
Robertson, A. S., Sherburne.
Robertson, D. D., Calhoun.
Robertson, James Owen, Bridgeport.
Robertson, J. D., Paducah.
Rodman, W. E., Hodgenville.
Rodman, W. L., Louisville.
Ross, W. P., Madisonville.
Ray, W. W., Springfield.
Rhinehart, James T.
Samuel, F. W., Louisville.
Schachner, Aug., Louisville.
Schoolfield, C. B., Dayton.
Scott, Lewis M., Frankfort.
Scott, Preston B., Louisville.
Scribner, E. T., Louisville.
Seargent, Andrew, Hopkinsville.
Selby, J. T., Elizabethtown.
Sheley, P. A., Louisville.
Shirley, Isaac A., Winchester.
Shirley, J. A., Grassy Lick.
Simmons, Nathan R., Kirklevington.
Simons, A. A., Cloverport.
Simpson, George T., Louisville.
Skillman, H. M., Lexington.
Skinner, C., Louisville.
Sleet, William E., Midway.
Smith, A. Wilkes, Richmond.
Smith, D. T., Louisville.
Smith, Egbert S., Paradise.
Smith, E. S., Hodgensville.
Smith, Jerome, Hodgenville.
Speer, James W., Alton.
Speer, J. H., Brownsboro.
Steadman, Sam. M., Lexington.
Stewart, Alex. H., Prestonburg.
Stewart, John Pugh, Farmdale.
Stewart, J. Q. A., Farmdale.
Stone, B. W., Hopkinsville.
Stone, John N., Berry.
Strickler, F. P., Elizabethtown.
Stuart, Robert, Zion.
Stucky, J. A., Lexington.
Stucky, T. Hunt, Louisville.
Swain, Enos S., Smithfield.
Swope, Samuel D., Marion.
Sandeas, H. B., Burgin.
Satterwhite, Thomas P., Louisville.
Spiers, J. B., Port Royal.
Stanley, Abraham F., Render.
Steele, J. R., Nevada.
Sullivan, R. R., Uniontown.
Taylor, Philip Richard, Louisville.
Taylor, T. J., Richmond.
Thompson, Pinckney, Henderson,
Thornton, G. G., Gravel Switch.
Todd, Charles H., Owensboro.
Todd, L. Beecher, Lexington.
Todd, Orrin D., Eminence.
Townsend, Oliver L., Orr.
Townsend, T. J., Shocoh.
Trapp, Charles W., Lexington.
Tuley, Henry E., Louisville.
Taylor, Basil Mitchell, Greensburg.
Underwood, W. L., Croppers.
Vance, Ap Morgan, Louisville.
Vaught, Clarence H., Richmond.
Vice, Thomas Byram, Sherburne.

Violette, J. D., Williamstown.
Wallingford, Alex. M., Mt. Carmel.
Walton, C. J., Munfordville.
Warner, George M., Louisville.
Wathen, William H., Louisville.
Webb, W. C., Wilmore.
Weidner, C., Louisville.
Wells, Joseph Ezra, Mt. Olivet.
Wesley, Cyrus, Newell.
Wesley, Isaiah S., Middleburg.
Wesley, J. T., Middleburg.
Wiley, E. M. Harrodsburg.
Williams, John M., Louisville.
Williams, Urbane V., Frankfort.
Willis, R. L., Lexington.
Willis, Sam. W., Pine Grove.
Willis, T. A., Finchville.
Wilson, F. C., Louisville.
Witherspoon, A. H., Lawrenceburg.
Witherspoon, J. T., Lawrenceburg.
Woods, R. T., Paris.
Woody, Sam. E., Louisville.
Wash, Bishop, Cornishville.
Woodbury, James T., Bremer.
Yager, F. J., Campbellsburg.
Yandell, David W., Louisville.
Yeager, W. H., Louisville.
Young, F. O., Lexington.
Yeaman, Malcolm H., Lexington.
Zinn, W. J., Williamstown.

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